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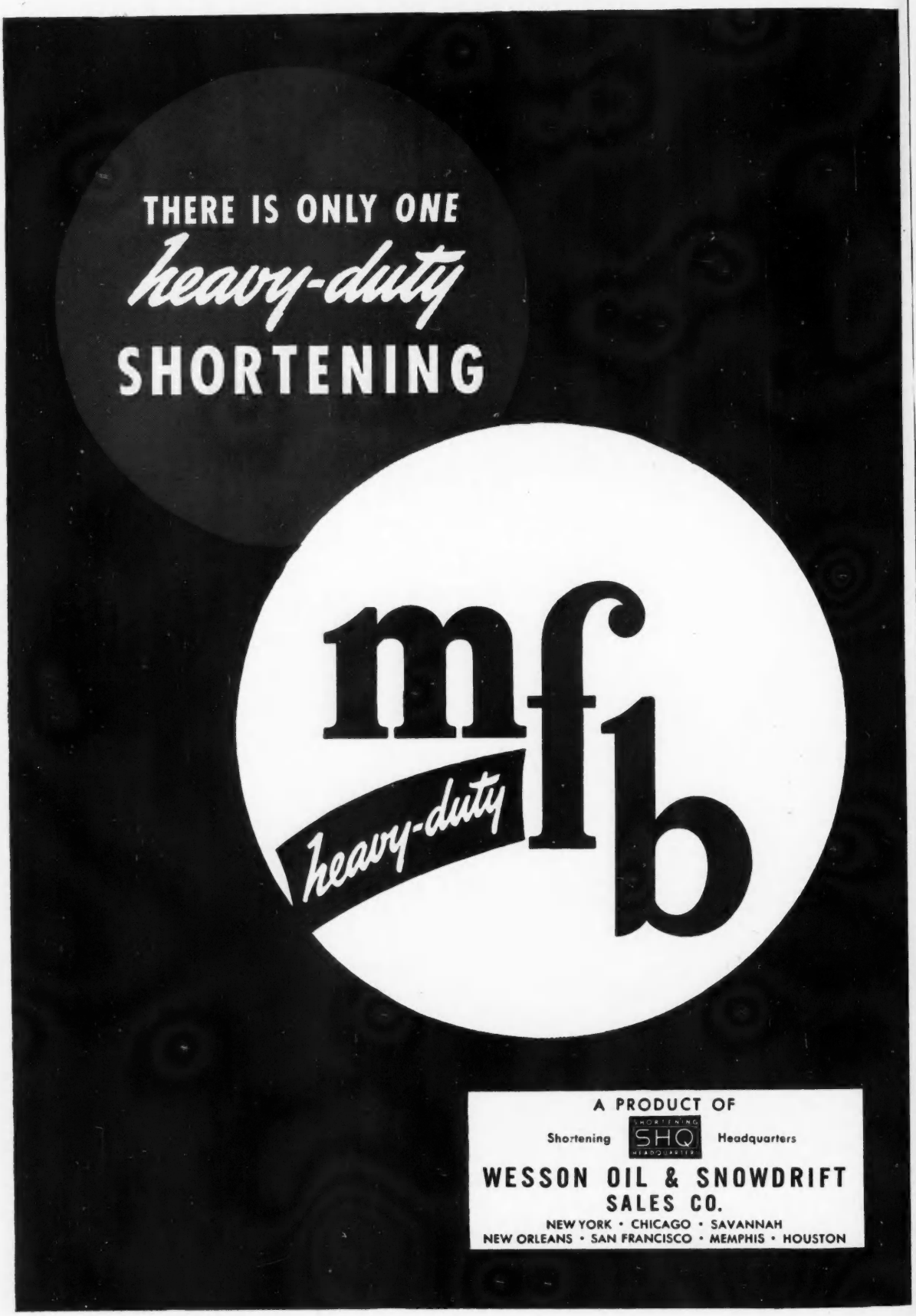
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The Role of Intestinal Bacteria in Nutrition[1]

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THE RELATION of intestinal bacteria to optimum health is one of the more important problems in present day nutrition, and a thorough knowledge of this problem will allow us to deal more intelligently with many phases of practical nutrition. Although little attention has been given to the beneficial effect of the intestinal bacteria, early workers did not ignore entirely the importance of the microorganisms inhabiting the intestinal tract.

Pasteur in 1885 suggested that animal life would be impossible without the cooperation of the microorganisms found in the digestive tract. Metchnikoff was interested in the relation of the type of flora to longevity. Other workers attempted to answer the question by raising aseptic or sterile animals. Much of this work has been reviewed by Glimstedt (1) but the results are far from conclusive.

In 1911 Osborne and Mendel (2) observed that rats which had been maintained for long periods of time on isolated foodstuffs became "koprophagists." They also showed that the addition of a small amount of feces from a normally fed rat stopped the decline in weight of the deficient animals. Cooper (3) was probably the first to suggest the actual synthesis of a vitamin by intestinal bacteria. About the same time (1915) Theiler, Green, and Viljoen (4) advanced the hypothesis that "vitamin B" was synthesized in the alimentary tract of ruminants. Recent work has clearly demonstrated the synthetic production of practically all of the components of the B-complex.

In 1926 and 1927 investigators in Copenhagen, London, and Cambridge described a phenomenon in rats whereby animals that had been depleted on a B-complex deficient diet spontaneously resumed growth and returned to normal appearance without the administration of vitamin-containing supplements. These spontaneous recoveries were obtained in rats fed rations containing large amounts of uncooked starch and were accompanied by the appearance of bulky white feces. Fridericia (5) called the phenomenon "refection." He also found the feces from refected rats to be higher in vitamin content than feces obtained from non-refected rats. Although there has been much interest in refection, most nutritionists have considered it a condition which they hoped would not appear in their animal colony. Guerrant and Dutcher (6) and Morgan and co-workers (7) have studied the effect of different types of carbohydrates on the intestinal production of B vitamins, but the various vitamins were not completely differentiated when this work was carried out.

Within the past few years this problem has been approached from a somewhat different point of view. Before 1940 any attempt to grow rats on a vitamin-B-complex-free ration supplemented with the crystalline vitamins then available resulted in complete failure. Shortly thereafter pantothenic acid was produced synthetically and when it was added in generous amounts in addition to the other five B vitamins—thiamin, riboflavin, niacin, pyridoxine, and choline—good growth and reproduction resulted. This observation was rather startling and for a time some workers felt that we had available all the B vitamins necessary for animal growth. However, the author was convinced that this was not true due largely to experiences with animals other than the rat. Undoubtedly the rats grew normally on the limited supply of vitamins not because all the factors were supplied in the diet but because of the synthetic activities of certain intestinal bacteria.

For some time we found it difficult to prove this theory, but the report of Marshall and co-workers (8) that the drug sulfaguanidine was an effective bacteriostatic agent for intestinal organisms suggested a possible approach. When 0.5 per cent of this drug was added to our regular synthetic ration, the growth of rats was reduced from the average of 25 gm. per week to less than 10 gm. per week (9). When rats receiving the drug were given 0.3 gm. of liver extract, growth reached 32 to 35 gm. per week. Para-aminobenzoic acid counteracted the effect of the drug but it was also shown that the effectiveness of the liver extract could be concentrated in a fraction distinct from para-aminobenzoic acid. The properties of this factor were found to be very similar to those of a factor described by Snell and Peterson (10)

[1] Presented before the 29th annual meeting of the American Dietetic Association, Cincinnati, on October 16, 1946.

which was essential for the growth of *L. casei* and which is now often referred to as folic acid. Later (11) it was shown that the reduced growth produced by a related drug, succinylsulfathiazole, could be counteracted by the addition of biotin and rather pure concentrates of folic acid. If the folic acid were added alone a biotin deficiency was produced and, if biotin were given alone, a folic acid deficiency developed. It was also found that the clotting time of the blood was increased in the presence of the sulfa drug and that this change could be counteracted by the addition of vitamin K. This observation was not surprising since it had been accepted for several years that vitamin K could be produced by the bacteria normally inhabiting the intestinal tract (12).

About the same time, Spicer, Daft, Sebrell, and Ashburn (13) reported the development of leucopenia, granulocytopenia, and anemia in rats given sulfaguanidine or sulfasuxidine and that these blood dyscrasias could be counteracted by a liver extract known to be rich in the *L. casei* factor or folic acid. This work clearly demonstrated that the production of a normal blood picture in the rat is dependent upon a factor produced by intestinal bacteria and that the factor involved is closely related to folic acid.

Further work in our laboratory (14) showed that the folic acid content of the liver of rats receiving succinylsulfathiazole showed a reduced folic acid content. It is apparent then that rats harbor bacteria that can synthesize folic acid if the diets are high in available carbohydrates but the synthesis may not always be sufficient to meet the optimum requirements. Further evidence has recently been obtained (15) on the actual changes in the flora during the administration of sulfa drugs. The greatest change takes place in the coliform and the Lactobacilli group. The organisms in the former group are more sharply affected, but they show a greater tendency toward reestablishment. The reduction in the number of bacteria in these groups is in part compensated by an increase in the number of enterococci and yeast-like forms. There is no large change in the total count although there was some tendency for the numbers to decrease after three and four weeks of feeding.

It is interesting to consider the results obtained with other animals in the light of those obtained with rats. It is now definitely known that monkeys fail when placed on a synthetic diet containing only six B vitamins (16)—thiamin, riboflavin, niacin, pyridoxine, pantothenic acid, and choline. This failure can be largely corrected by the addition of biotin and folic acid. Thus in the monkey, deficiencies of these two factors develop without the addition of sulfa drugs. When sulfa drugs are added, the deficiency related to folic acid is not aggravated but a more severe biotin deficiency is produced.

In contrast to the monkey, the dog grows remarkably well on a synthetic diet containing the six B vitamins and normal development still occurs even when 4 per cent of sulfasuxidine is added. Even severe bleeding failed to precipitate any deficiency, and excellent hemoglobin regeneration resulted in the presence of the drug. Apparently the bacterial flora in the dog is so well established that sulfa drugs do not cause any serious alteration. However, changes may occur when a deficiency of some of the better known B vitamins is produced (17). For example, dogs placed on diets low in nicotinic acid develop a folic acid deficiency in addition to the classical black-tongue syndrome. If folic acid is supplied in the diet, nicotinic acid deficiencies can be produced time after time and each deficiency will respond to the single administration of nicotinic acid. If folic acid is omitted, the dog may fail to respond after the production of two or three deficiencies.

It is also interesting to observe that if dogs are made deficient in nicotinic acid and then given sulfathiazole, the animals fail to respond until fresh liver or raw milk is given. The factor in milk and liver necessary for the dog under these conditions is undoubtedly related to the factor which we have found to be necessary for the monkey. If monkeys are given eight of the B vitamins—thiamin, riboflavin, niacin, pyridoxine, pantothenic acid, choline, folic acid, and biotin—they will develop rather well. However, if a deficiency of riboflavin, pyridoxine, pantothenic acid, or folic acid is produced, the monkey will not respond completely to the administration of the missing vitamin, either as far as growth or hemoglobin regeneration is concerned (18). The monkey also shows a reversal in the neutrophile-lymphocyte ratio. This condition can be completely counteracted by the administration of fresh liver or raw milk. Apparently when this extra strain is placed on the animal, sufficient quantities of this new factor are not synthesized by the intestinal bacteria. We have preliminary evidence that a deficiency of this factor may also occur in rats during the extra strain of reproduction and lactation. A similar condition may be produced due to limited food intake and perhaps administration of thyroid. Thus, we have evidence that at least three of the newer B vitamins are very closely related to intestinal synthesis.

However, evidence is also beginning to accumulate to indicate that a considerable portion of the total requirement of each of the older B vitamins may be supplied by intestinal organisms. It is obvious that the degree of synthesis in this case is less because, if this were not true, we would have had more difficulty in producing a deficiency of these older factors. About four years ago we showed that the fat content of the diet had a marked effect on the riboflavin requirement of the rat. Diets which contained dextrin and low levels of riboflavin produced a much more severe riboflavin deficiency when a large portion of the dextrin was isocalorically replaced by fat.

Later work demonstrated that this effect is directly dependent upon a decreased synthesis of riboflavin in the presence of the fat. The degree of synthesis is not only affected by the level of fat but also by the kind of fat and the type of carbohydrate present (19). In our studies we found a relatively small amount of thiamin synthesized, but Näjjar and co-workers (20, 21) have reported the synthesis of both thiamin and riboflavin in the tract of humans when diets high in dextrimaltose are used. They also found that riboflavin was synthesized in much greater amounts than thiamin. The production of thiamin was greatly reduced by the administration of sulfasuxidine but no effect on riboflavin was observed.

In a recent paper by Coates *et al.* (22) it has been shown that rats on a refective diet excrete appreciable amounts of riboflavin in both the urine and feces but the thiamin excretion is limited to the feces. The administration of sulfa drugs depressed markedly the excretion of both the vitamins. Most of the drugs also produced a severe loss in weight and many of the declining rats showed symptoms of beriberi. This indicates that thiamin synthesis also is most limiting on refective diets.

The possible production of nicotinic acid within the animal body has been recognized for several years due largely to the fact that rats and chickens apparently developed quite well on diets very low in this vitamin. Several workers suggested that this synthesis occurred within the body tissues. That such production may occur has not been disproved completely, but ample evidence is available to show that the nicotinic acid requirement of several animals is greatly affected by the type of diet. For example, the rat will grow very well on a synthetic diet containing 9 per cent of casein plus all the B vitamins except niacin. However, when appreciable amounts of this diet are replaced by corn grits very poor growth results. This growth retardation can be counteracted merely by the addition of niacin (23). This suggests then, that the presence of corn alters the intestinal flora sufficiently to reduce the synthesis of niacin to a level which precipitates a deficiency. This relationship is complicated somewhat by the fact that tryptophane has exactly the same effect as niacin. However, this relationship can be explained on the basis that when nacin is added, tryptophane may be used more efficiently in the body. When tryptophane is added, greater synthesis of niacin may occur (24).

It is apparent from balance experiments that in all cases the niacin excretion is much greater than the dietary intake On the synthetic ration alone, the niacin excretion was 100 times the intake. When corn was added to the synthetic ration, the excretion was reduced to about three times the intake but when tryptophane was added together with the corn the excretion was increased again to five times the intake.

Recently Ellinger and Benesch (25) have clearly established the biosynthesis of nicotinamide in the human gut. The degree of this synthesis was greatly decreased upon administration of succinylsulfathiazole. They have also carried on certain *in vivo* experiments which are very interesting. When human feces were obtained by caecostomy and incubated under aerobic conditions, a considerable synthesis of nicotinic acid took place after the third day. When the feces were incubated anaerobically the organisms destroyed two thirds of the nicotinic acid present in the original medium.

Näjjar *et al.* (26) have also produced evidence for the synthesis of nicotinamide by bacteria in the intestinal tract. However, these workers found no reduction in the excretion on N-methyl nicotinamide upon the administration of sulfasuxidine and suggest that the difference may be due to the nature of the basal diets used.

Although much more work is necessary in the case of humans, it is obvious that the pellagra problem is more or less directly related to intestinal synthesis. Apparently humans on certain mixed diets can get along with rather low intakes of nicotinic acid. However, the addition of corn probably precipitates a nicotinic acid deficiency due to the fact that the corn is low in both niacin and tryptophane, and this condition decreases the intestinal synthesis of the vitamin. Other factors may also be involved since we (27) have recently shown that the addition of lactose or milk powder to the basal ration of the rats increases the synthesis of both niacin and folic acid. When a synthetic milk diet was used, the addition of butter fat allowed greater synthesis of these vitamins than did the addition of corn oil. Excess niacin increased the synthesis of folic acid and excess folic acid increased the synthesis of niacin. These effects were prevented by the addition of sulfa drugs.

We (28) recently obtained good evidence that pyridoxine may also be synthesized in the intestinal tract of rats under certain conditions. In an attempt to improve the biological assay for pyridoxine, both folic acid and biotin were added to the basal ration. When sucrose was replaced with dextrin in such a diet, the rats grew rather well and failed to show any vitamin B_6 deficiency. Through studies on xanthurenic acid excretion and pyridoxic acid excretion, we were able to demonstrate clearly the synthesis and utilization of vitamin B_6 active compounds in the tract. There is no definite evidence in the case of humans, but it may be that this is one of the reasons why vitamin B_6 deficiencies are seldom encountered in humans.

The author has already given evidence for the intestinal synthesis of biotin in experimental animals. Similar evidence is also available for human beings. Oppel (29) found that the total excretion of biotin in human beings was three to six times that present in the diet. Näjjar and Holt (20, 21) have produced evidence that the bacterial synthesis is quite ade-

quate to take care of the need of both biotin and folic acid for man.

Very recently Dinko *et al.* (30) have presented evidence obtained with young adults that the total daily urinary and fecal output of para-aminobenzoic acid, biotin, folic acid, and pantothenic acid exceeded the dietary intake. This was not true in the case of thiamin, riboflavin, pyridoxine, and nicotinic acid but this does not mean that part of the daily requirement cannot come from intestinal synthesis.

So far the possibility of the destruction of vitamins in the intestinal tract has been mentioned only briefly. We (31) have recently obtained evidence with the chicken which indicates that this may be true. Chickens grown on a synthetic diet containing folic acid grew better when the diet contained sulfa drugs and streptomycin than when antibiotics were not added. We have some evidence indicating that the type of flora may be changed under these conditions. The improved growth may be due to the decrease in the organisms destroying vitamins or organisms that are producing toxic materials which may be absorbed and retard normal metabolism. It is obvious that studies on the relation of nutrition to longevity and to resistance to disease may have little meaning until the production or destruction of nutrients in the tract are better understood.

In this brief discussion definite evidence has been presented for the intestinal synthesis of vitamins in the intestinal tract and that these vitamins may be used to varying degrees by the host. From the practical point of view this evidence can be used in several ways. In the first place, we may become very discouraged over these variations and suggest that accurate requirements for the B vitamins can never be established. Second, we may recognize the intestinal synthesis and then try to establish the exact amount supplied by the flora and the exact amount of each vitamin needed in the diet. The author believes that we have no reason to become discouraged and that we would be wasting our time to attempt to establish these differential requirements. It is better to insure an adequate dietary intake of each vitamin and rely only to a limited extent on intestinal synthesis. In other words, we should set our requirements at a level sufficient to meet the need on all diets. It is more important to place further emphasis on the newer factors. Surely the success which folic acid is now finding in nutrition is sufficient evidence for additional studies on new factors. Although much work went into the final establishment of the importance of folic acid, no one can doubt that studies on intestinal synthesis had an important part in the final solution. There is no reason to believe that equally important relationships may not come from further studies on intestinal synthesis.

Finally, we should not ignore the original ideas of Metchnikoff that certain types of bacteria in the tract may be deleterious, because they destroy certain vitamins or amino acids or because they produce toxins that are detrimental to health. As we learn more about intestinal flora we should be able to control both the beneficial and the detrimental types of organisms and to compensate for changes which we cannot control.

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INANITION IMMUNITY

In 1944 Stoerk and his associates of the Department of Pathology, Columbia University, showed that in rats partial pyridoxine (vitamin B_6) deficiency produces atrophy of the thymus and other lymphoid tissue without a parallel reduction in body weight. Daugherty and his associates of Yale subsequently confirmed an earlier belief that lymphocytes are the main source of specific antibodies. If so, a diet deficient in pyridoxine should lead to reduced specific antibody formation.

Stoerk divided young albino rats into three groups of litter mates. The animals of group 1 were weaned on a diet deficient in pyridoxine but otherwise adequate. Restricted amounts of the complete diet were fed to the rats in group 2 in order to duplicate the growth retardation in group 1. A second control group received a complete diet *ad libitum*. During the first five weeks on these diets, the rats in group 3, the adequately fed control group, increased in body weight from an average of 46.9 gm. to 160 gm. The two restricted groups increased but half that rate. In the pyridoxine deficient group the average terminal thymus weight was 0.047 gm. In the two control groups, the average was 0.288 gm., or six times as much. At the end of five weeks all three groups were immunized against washed sheep erythrocytes. Each animal received three intraperitoneal injections of 0.5 cc. of 5 per cent washed red blood cells. Five days after the last injection the animals were exsanguinated. The resulting serums were titrated individually for hemagglutinins and hemolysins. Of the nine pyridoxine deficient rats, six showed no measurable agglutinins or hemolysins. The other three had low titers. The average composite (hemagglutinin and hemolysin) titer of these nine rats was 1:7. Of the 16 animals of the two control groups, 13 had comparatively high titers (e.g. 1:320). The average composite titer for the two groups was 1:150. This is twenty times the average titer of the pyridoxine deficient group. A 95 per cent reduction in specific antibody formation is thus produced by vitamin B_6 deficiency.

Of even greater clinical interest is the contrast between the two control groups. In group 3, fed the complete diet *ad libitum*, the average composite antibody titer was 1:52. In group 2, fed restricted amounts of the same well balanced diet, the average composite titer was 1:238. There was thus a five-fold increase in specific antibody formation associated with decreased caloric intake. More detailed studies of this form of inanition immunity are now in progress.—*From an editorial, J. A. M. A. 132: 81, 1946.*

Nutrition Research in China[1]

WILLIAM H. ADOLPH

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THE FOLLOWING memoranda have been prepared to meet inquiries from investigators in this country regarding the nutrition literature of China. Active research in the nutrition field has been conducted in China for the past 20 to 25 years. The results of these studies have been published mainly in China and for the most part in the English language; usually papers published in Chinese have been accompanied by summaries in English.

The data of the earlier years are scattered through various journals and much of it is now inaccessible or difficult to locate. More recently research papers in nutrition have appeared in the *Chinese Journal of Physiology*, the *Chinese Medical Journal*, and the *Journal of the Chinese Chemical Society*. In addition, at least one agricultural college has issued a series of nutrition research bulletins. A monograph series of reviews for nutrition workers under the title *Nutrition Notes* was issued by the Chinese Physiological Society, but its publication was interrupted by the war. To meet the war emergency a mimeographed publication, *The Biochemical Bulletin*, was printed in free China. The Chinese Institute of Nutrition, organized during the war, plans a new journal specifically to serve the nutrition field.

This resumé, because of limitations in space and difficulty in indexing war-time journals, is not complete; mention of many important papers must be omitted. References do include, however, a few of the more recent reports and certain of the key reviews of the Chinese nutrition literature.

General data on nutrition in China are found in chapters by Maynard and Swen (1) and by Snapper (2), and in a nutrition review by van Veen (3) which makes special reference to research in the Far East. A literature review has been prepared by Tang (4). Thomson (5) outlines the problems involved in nation-wide nutritional improvement, while more popular articles are those by Adolph (6, 7) and by Kramer and Nutting (8). Those investigating Chinese nutrition problems may also examine the kindred literature of Japan, India, Java, Malay, and the Philippines, since many of the food materials are common to these several countries and the fundamental agricultural factors are similar.

An interesting discussion on dietary principles in ancient Chinese medicine has been written by Hou (9).

ANALYSES OF CHINESE FOOD MATERIALS

Tables giving analyses of Chinese food materials have been published by Wu (10), and by Read and co-workers (11). The analyses resemble rather closely those for corresponding food materials in the United States, except for soybean products and other items peculiar to the Orient. These lists indicate that the Chinese housewife has a much larger variety of vegetables, particularly of the green leaf variety, to choose from than the Occidental housewife.

Among later published analyses should be mentioned those of Chiu (12). The bulletins of the Hawaii Agricultural Experiment Station, especially the one on Oriental vegetables (13), contain valuable data on Chinese food materials grown and used in the Hawaiian Islands. Analyses have also been made of the mineral constituents (14, 15). Yi and Ferny (16) report analyses of leaves, bark, and roots for emergency use in time of famine. Wu (17) during the war tabulated all analyses of Chinese foodstuffs to date. The food tables prepared by Platt (18) for tropical areas contain data applicable to South China. Read and Wagner (19) give an interesting descriptive list of Shanghai vegetables.

DIETARY STUDIES

Resumés of the dietary studies in China have been prepared by Kung (20) and by Liu and Chu (21). The latter summarize a total of 18 dietary studies conducted before 1937 and 12 during the war period. More recent studies (22–24), have been concerned largely with army diets. Guy and Yeh (25) give data on Peiping diets; they contrast the milled cereal diet of the well-to-do with the whole cereal-soybean diet of the poorer classes.

[1] Received for publication July 20, 1946.

The range of figures reported in these dietary studies is shown in Table 1. The reviewer has added one column of figures of his own which are in the nature of weighted averages. Tang and Chang (26) calculated the nutritional content of the Chinese dietary using crop production data. Their figures fall within the range of those given in Table 1.

TABLE 1

Resumé of dietary studies in China showing daily per capita intakes

	CALORIES	PROTEIN	FAT	CALCIUM	PHOSPHORUS	IRON
		gm.	*gm.*	*gm.*	*gm.*	*mg.*
Range	2045–3453	47–112	15–54	0.27–1.09	0.9–3.3	12–78
Average	2600	80	30	0.40	1.6	24

The food groups which comprise the Chinese dietary and the percentage contribution of each group to the total caloric intake are as follows: cereal and legumes, 88 per cent; vegetables and fruit, 5 per cent; fats and oils, 4 per cent; and meat and eggs, 3 per cent. It is evident that the Chinese diet is essentially a cereal diet; on the average, meat is consumed in very small amounts, milk is practically absent, and the visible fat is also low.

NUTRITIONAL INVESTIGATIONS

Vegetarian diets. Wu and co-workers in Peiping have over a period of years carried out studies on the vegetarian diet when fed to rats. Wu (27) summarizes the results of his earlier experiments by stating that no combination of vegetable materials was found that is equal in terms of growth and reproductive performance to a good omnivorous diet. The most recent papers in this series (28–30) are those concerned with hypocalcemia, cataract, and life span. The authors also find no significant difference between their vegetarian stock diet and whole cereal diets containing soybean (31).

Measurements of the protein efficiency and the biological value of vegetable food proteins have been carried out on most of the common cereals and legumes, using laboratory rats. Recent studies include the proteins of watermelon and pumpkin seeds (32), and cabbage (33). There is some suggestion of a supplementary relationship among the proteins of the mixed cereal diets (34–37). The biological values of various vegetable proteins have also been measured with human subjects (38–40).

Other studies have been concerned with the proteins of the cowpea (41), millet (42, 43), leaf vegetables (44), and wheat and rice (45). Wu (27) and Adolph (46) have reviewed the protein problems of the Chinese dietary.

Apart from the cereals mentioned above and the soybean products discussed below, a number of food materials peculiar to China have received recent attention. Chinese celery cabbage is probably the most widely used of the green leaf vegetables and has been studied with special reference to its carbohydrate content (47). Determinations have also been published on the available carbohydrate content of other green leaf vegetables (48) and cereals (49). Among the other food materials studied are kidney beans (50) and sweet potato (51). An experiment is reported (52) in which positive balances are obtained with human subjects when sweet potatoes constitute the sole source of dietary protein. Chen (53) has studied the nutritive value of dried silk worm pupa.

Maynard (54) recommends the larger use of leaf vegetables in the Chinese diet. In this connection it has been shown (55) that increased growth and an enhanced calcium intake result when up to 15 per cent of the cereal in the diet is replaced by Chinese celery cabbage.

One of China's distinctive contributions in the nutrition field is the soybean. During the war, attempts were made in this country to increase its use and valuable reviews were published on its nutritive value (56–58). The Chinese seem to have used the soybean effectively as a nutrient in three ways: first, in the form of soybean meal as a constituent of the millet-maize-soybean mush of North China; second, in the form of its protein, soybean curd (or soybean milk), or products derived therefrom; and third, in the form of soybean sprouts.

Soybean milk is being increasingly used as the protein basis of a food for infant feeding in clinics in China (59–62). A useful bibliography on soybean milk has been prepared by Smith and Beckel (63). Recent studies on the nutritive value of soybean protein have used laboratory rats (64, 65) and also human subjects (38, 66).

Soybean sprouts have been studied particulary with respect to their ascorbic acid content (67, 68). Other aspects of the germinating process have also received some attention (69, 70).

Nitrogen metabolism. The nitrogen metabolism of the Chinese is frequently characterized by a low urinary nitrogen excretion and in certain types of diets by low nitrogen digestibilities. Balance studies have been reported from a number of laboratories (71–73). Among the earliest data on nitrogen metabolism are those of Read and Wong (74). Wang (75) gives data for Chinese in Manchuria. Urinary nitrogen determinations accompany some of the measurements on basal metabolism (see below). Creatinine coefficients are not significantly different from those for Occidentals on mixed diets. Wong (76) attributes high values for uric acid excretion to tea drinking.

Calcium. Reviews by Adolph (77, 78) draw attention to the low calcium intake in China, which has been estimated variously at 0.30 to 0.45 gm. daily. In some nutrition clinics, bone meal and limestone, as well as other calcium salts, have been used to supple-

ment the calcium supply. The suggestion has been made that a calcium salt be added to the almost universally used soybean sauce as a device to increase calcium intake (79). The calcium in most of the leaf vegetables, except spinach, is readily available (80).

Calcium balances of normal Chinese are recorded in a number of studies (40, 71, 72, 73, 81). There has been some controversy over the amount of the calcium requirement for China. Nicholls and Nimalasuriya (82) suggest that the requirement for Orientals is less than that usually accepted for the Occidental. Experience with low calcium diets (2) suggests that after a period of low calcium intake, less calcium is needed to give a positive balance than when the body is accustomed to a high calcium intake.

Phosphorus. Metabolism experiments which report calcium balances usually include data on phosphorus as well. The P:Ca ratio in the Chinese diet is usually about four. Most of the metabolism experiments on Chinese subjects on ordinary diets record positive phosphorus balances. This seems to be true even though the phytin content of cereal and vegetables is generally high (83).

Iron and copper. Determinations have been published on the iron (84) and copper (85) content of Chinese food materials.

Iodine. Adolph and Tang (86) review the question of iodine and goiter; simple goiter is endemic in large areas of inland China (87). Additional analyses have been reported (88) on the iodine content of salt. Recent observations are recorded on simple goiter in Yunnan (89).

Fluorine. [1]Fluorine analyses of foodstuffs and water have been reported from Shanghai (90) and from Szechuan (91, 92). Appreciable amounts are found in common salt (93).

Vitamins. The earlier literature on vitamins is reviewed by Hou (94). Of the many contributions on the vitamin content of Chinese food materials since 1936, it is possible to list only a few typical papers dealing with vitamin A and carotene (95–97), vitamin B_1 (98, 99), vitamin C (100–105), vitamin D (106), and vitamin P (107).

Serum vitamin A and carotinoid levels (108) as well as nicotinic acid levels (109) for Chinese have been determined. Normal excretion levels for nicotinic acid (109, 110) have been studied.

The vitamin C level of the plasma has been measured (111, 112); experiments have also been carried out with vitamin C using the saturation technique (113–115). Cooking in the Chinese way may occasion losses of 50 per cent or more in the vitamin C content of vegetables (116, 117).

Basal metabolism. Many of the determinations reported in the literature suggest that the basal metabolic rate of the Chinese, both men and women, is slightly below Occidental standards. Recent papers include measurements on adults (118, 119) and on children (120). Whether the basal metabolic rate of the Chinese is actually low may depend in part on the method used for calculating body surface. Anthropometric data for the Chinese (121) are reviewed by Wu (122) and Tang (4). The average body weight is given by Wu as 55 kg. and the average height as 168 cm.

Nutritional requirement. A recommendation on the minimum nutritional requirement for China was prepared by the Council on Public Health of the Chinese Medical Association (123). The minimum energy requirement for the Chinese adult has been set at 2400 calories and the protein requirement at 1.5 gm. per kg. of body weight. Cheng (124) suggests that these figures are too high.

DEFICIENCY DISEASES

Maps have been published (21) showing the distribution of keratomalacia, pellagra, beriberi, osteomalacia, and also of simple goiter in China. The subject of vitamin deficiencies has been reviewed by Hou (125); important papers concerned with deficiency diseases were presented at the meetings of two scientific congresses in the Pacific area (126, 127).

Cutaneous manifestations of vitamin A deficiency, first reported by Frazier and Hu (128), have been further confirmed (129, 130). Vitamin A has been administered parenterally (131). The measurement of dark adaptation has been applied to army personnel (132) and to medical students (133).

Rickets and vitamin D are discussed by Liu (134) and by Snapper (2). Liu (135) discusses osteomalacia as a nutritional disease and reviews the metabolism studies conducted by himself and colleagues. These studies are being continued (136). An outbreak of scurvy has been studied by Morgan and Gault (137). During the winter in Peiping the vitamin C content of the blood is low (138). The amount of vitamin C required to prevent scurvy in Chinese patients is 50–75 mg. per day (139).

Vitamin B_1 metabolism with normal and beriberi patients has been studied by Hou and colleagues (140, 141). Lu and Platt (142, 143) showed that the pyruvic acid level of the blood could be used to assess vitamin B_1 deficiency. The problem of rice polishing in relation to beriberi is a problem involving all areas of East Asia and the Southwest Pacific generally; data and discussions on this topic are frequently found in the literature. Infantile beriberi is reported from Hong Kong (144). Hou (145) has examined the ancient Chinese medical literature and finds beriberi described in the fourth century B.C. Symptoms due to riboflavin deficiency (146, 147) have been studied. Outbreaks of pellagra are reported from Nanking (148) and Shanghai (149).

The cases of edema which have been reported in China seem to be related to nutritional imbalance. Ling (150) has studied a group of famine edema cases

which responded favorably to a diet containing liberal amounts of animal protein.

FEEDING OF REFUGEES

Many practical lessons in large scale feeding have resulted from experience with famine and war refugees. Famine relief organizations, however, have concerned themselves largely with organizing food transport and reclamation projects. Less attention has been given to a study of nutritional factors. Witham and co-workers (151) give suggestions growing out of their experience in Shantung. Refugee feeding on a very large scale was undertaken in Shanghai during the earlier phases of the Sino-Japanese War. Soybean milk was used; various deficiency diseases were encountered, some of them in acute form (152).

INVESTIGATIONS NEEDED

No systematic nutritional survey as far as we know has yet been undertaken in China. A great need exists for such organized data, making use of the newer methods of clinical analysis and applying them to large population groups. Meanwhile the opinion of those acquainted with the nutrition situation is that the Chinese diet tends to be deficient in calcium, protein, and vitamins A, B, C, and D.

More data are likewise needed on the nutritive value of Chinese food materials; this should involve not merely laboratory analyses but data based on animal experiments.

Experimental studies are needed in China on typical Chinese diets using human subjects; these should include careful metabolism measurements. More data in this category are needed to help in establishing the nutritional requirements for China.

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[2] During the war, the Chinese Medical Association officers who were in the U. S. and out of touch with the Shanghai office which was in occupied China thought it wise to issue an American edition. In this American edition, whose volume numbers did not correlate with the China edition, certain articles found in the China edition were reprinted, but many other articles were not reprinted. To make the matter still more confusing, there was also issued a West China edition. All three editions of the *Chinese Medical Journal* appeared in English.

* References marked with an asterisk are in Chinese.

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U. S. Food Supply Improved Even During the War

Results of a survey recently published by the Bureau of Human Nutrition and Home Economics, USDA, show that in 1945 supplies of essential nutrients, including major vitamins, were highest since 1909. Supplies provided an average of 3300 calories per person per day, and it is estimated that had prewar quantities of fats and sugars been available the average supplies of calories would have been about 3500 per day. Figures indicate that consumption of calcium by the civilian population during war years rose to 120 per cent of prewar level, which is attributed to a rise in milk consumption. Other increases are approximately as follows: calories, 4.6 per cent; protein (despite meat shortages), 13 per cent; ascorbic acid, 23 per cent; vitamin A, 22 per cent; thiamin, 43 per cent; riboflavin, 36 per cent; niacin, 38 per cent; iron, 36 per cent.

In this survey, which covers the 36 years from 1909 to 1945, it is interesting to note that at no time, even during the depression, did the average calorie supplies in this country fall below the level of 3100 per capita per day. From 1909 to 1933, the average quantity of protein available to citizens dropped rather steadily, and in 1935 a low point of 85 gm. per person per day was reached. However, protein supplies have risen steadily since that time, as consumption of milk, eggs, meat, poultry, and fish have increased. The amount of vitamin A in the national food supply has been rising since 1925, with the highest average value reached in 1945 when the level of 9900 I.U. per capita was reported. The increase in consumption of citrus fruit since 1930 has caused a steady acceleration in the quantities of ascorbic acid, while the increased use of enriched bread and flour and larger supplies of cereals have been reflected in the increased supplies of the B-complex vitamins.

The data do not reveal regional variations in distribution which may make some communities, economic groups, or regions subject to dietary inadequacies.

Constructing a "Congee" Kitchen for Relief Feeding in China[1]

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TO MEET the need for dispensing cooked food in the area of the flooded region in Honan, a combined CNRRA-UNRRA team traveled to Hsi-Hwa, a town in the area which, until a month before, had been entirely surrounded by flood water for several miles. The water had receded by the time we arrived, so that one could walk the 15 miles to and from Chou-Kia-Kou, the nearest source of food supply.

As we approached Chou-Kia-Kou from the west, there was no evidence of devastation; there was a luxuriant growth of wheat in the fields. Only the many beggars along the road (mostly old people and children) indicated that there was not prosperity for everyone. Chou-Kia-Kou is divided by the river. North of the river were evidences of flood destruction. On the surface, the town appeared prosperous with shops conducting a brisk business, but it was crowded. Here also there were many beggars; disheveled women clutching scrawny babies to their breasts, and ragged children.

To reach Hsi-Hwa one walks 45 *li* (15 miles) north across country which until about a month before our trip was covered with flood water. For the first few *li* we walked along the dike where whole villages seemed to have settled themselves in huts built of mud and straw. Here we found evidences of privation. Naked children in the sun showed thin bodies with distended stomachs, and there were many new graves. On stopping for lunch at a roadside stand, we found the only food available to be steamed bread, baked sweet potatoes, and Yellow River tea (hot water, no tea leaves). Willow buds were being sold as food and children hunted wild greens among the violets along the bank.

We crossed the river in a small junk. The remainder of the trip to Hsi-Hwa was over a vast level plain, barren and desolate as far as the eye could see. During eight months each year for eight years the Yellow River has covered this land, depositing a new layer of silt until it was then as our baggage coolie said "two men deep"—about 10 ft. Only the roofs and upper parts of houses showed where there was once a village. Occasionally we passed a great hole where someone had dug down to find a tree for firewood. This year's water had receded by the time we reached this region and the land was drying rapidly.

Only the foot path toward Hsi-Hwa showed any evidence of life. It was a picture of utter desolation—not a living thing anywhere. On our return trip 10 days later, some ground had been cultivated. We saw men, women, and children pulling their own implements across the ground in an attempt to prepare it for planting, but we saw not one farm animal.

As we approached Hsi-Hwa, we met men with wheelbarrows piled high with beds, tables, doors, and farm implements. On inquiry, we learned that they were from Hsi-Hwa and they were selling these belongings in order that they might buy food. One man hoped to sell his plow and *kou* (cooking pot) for $18,000. He had a family of five and it cost $4500 per week to feed them. Other families were moving to Chou-Kia-Kou—they could no longer eat in Hsi-Hwa. Most of the men and women of working age had already gone to other places to find a means of livelihood.

Our coolie told us that he had been a farmer before the flood and owned 18 *mou* of land. He had been forced to sell all but 3 *mou* and was paid only $400 per *mou*. He hoped to start farming again if the break in the dike should be closed. Here certainly was a place where cooperative farming could be accomplished with the aid of UNRRA tractors. The landmarks, animals, and even the farm implements were gone, and yet the people smiled when they spoke of misfortune and talked of a hopeful future. One could not help feeling warmth and sympathy for these honest, hard working, friendly people of the soil.

Hsi-Hwa was evidently at one time an orderly city of paved streets with many substantial buildings.

[1] This paper, received in the JOURNAL office June 4, 1946, is a combination of two reports which the author made to UNRRA headquarters in Washington on her work.

When we arrived, it was a shambles from floods, with part of the town still under water to the extent that it was used for fishing. The compound of the magistrate's office stood in stagnant pools. There were stinking cesspools along the streets and within abandoned buildings. Because the town inside the walls is lower than the silt-covered area outside, no easy method of drainage could be found.

The only local food available was from a few vegetable patches grown within the city walls, and from the very few scrawny pigs and chickens owned by householders. Everything else was carried across country by wheelbarrow or on carrying poles.

The early morning food markets offered a bit of pork, some small fish caught by net in the flooded portion of the town, a few green vegetables, sweet potatoes, millet and flour, most of which had been imported from Chou-Kia-Kou. There was little cotton cloth and little raw cotton for sale, although we saw women spinning and weaving in the doorways of their homes. It was estimated that there must have been at least six looms in the town. The market period lasted only an hour or two, and during the rest of the day the markets were dormant.

Most of the people, having suffered in the town for eight years of flooded seasons, had about exhausted their resources and could no longer afford to buy even the minimum necessities. It was an astonishing fact that although food was scarce, it was cheap because of the small demand. Most people existed on weeds, tree buds, sweet potatoes, and grain. One was impressed by the fact that inhabitants of Hsi-Hwa were mostly children and old people. There were a number of beggars from both groups.

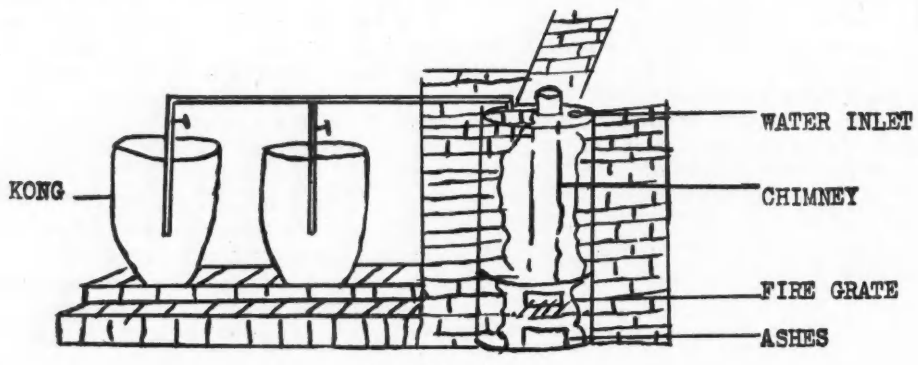
Within two hours after our arrival at Hsi-Hwa, we held a meeting of a citizens' advisory committee. This group of men, whom we felt were representative of the people, were to help us make ready a location for a "congee" kitchen and would be responsible for deciding who should be entitled to receive congee.

Congee is a rice or millet gruel, considered to be a native Chinese food. The recipe used was: 30 catties (lb.) of millet, 20 catties of sweet potatoes, and 5 catties of beans.

The political headquarters compound was chosen as the location for our kitchen because it was centrally located. However, it was filthy with back wash of the flood and human excreta and strewn with trash and broken bricks. At our suggestion a group of 200 laborers, appointed by the mayor, appeared the next day with baskets and shovels. Under our direction they not only cleaned the place in a few hours, but also tore down useless broken walls, built others, installed a specially constructed cooker complete with chimney, built a brick serving counter, and prepared a storage space.

Since no conventional equipment was available, it became necessary to construct our equipment out of the materials at hand. Cooking was to be done entirely by steam. The steam boiler, made from a 50-gal. oil drum, had been constructed in Kaifeng and transported to Hsi-Hwa to conduct a practical experiment with this type of cooking. A fire box, on which the boiler fitted snugly, was constructed from one half of an oil drum. The chimney passed through the center of the boiler so that the heat passing through might be utilized. A gasketed screw top opening at the top of the drum was used for filling the boiler with water; the other opening had a 1-in. pipe outlet attached for issuance of steam. This steam was conducted by pipe into two large glazed pottery *kongs* of about 30-gal. capacity, which were used for cooking the congee. The boiler was insulated by a masonry exterior of brick to increase pressure. A brick chimney was built to conduct smoke out through a hole in the wall. This was a real innovation, for most Chinese stoves smoke into the room. Since our length of pipe was short and we wanted to utilize the steam as closely as possible to the boiler, it was necessary to lift the cooking *kongs* by placing them on a brick platform.

Kitchen equipment collected by the committee for us consisted of a table for cutting potatoes; three large serving *kongs* of about 20-gal. capacity; five wooden covers to eliminate flies and dust and to con-



THE CONGEE KITCHEN

serve heat in the *kong*; a stirring paddle; four water buckets; four water *kongs*; four uniform sized serving dippers; a measuring dipper; and three pottery bowls for mixing flour and washing potatoes. The vegetable preparation women brought knives.

One *kong* would hold enough congee to feed 130 to 140 people. To feed 1000 people, eight *kongsful* were needed. Eight *kongs* could be cooked with approximately 200 catties of wood. The fuel saving was remarkable. Accounts of the Salvation Army kitchens in China indicate that they used 565 lb. of coal plus 130 lb. of wood per day in preparing congee for 1000. It was figured that the cost of feeding one person per day was $8 CNC (approximately 1.9 cents American money), including the cost of food and fuel, but not including labor cost.

Steam cooking is slower than cooking by direct heat. However, by staggering serving periods, we were able to prepare during the day sufficient amounts to feed the crowd of 1000. This capacity might easily be increased to 1300 or possibly to 1500, but for all reasonable purposes, one unit could not accommodate more than that number. It took from 5 a.m. to 3 p.m. to complete the operation for feeding 1000 people. At 5 a.m., the firemen started the fire under the boiler. At 7:15 cooking of the first *kong* was started. It took about 40 minutes to bring the water in the *kong* to the boiling point, then 50 more minutes to cook the congee. While one *kongful* was cooking under full steam, the valve could be half turned in the other to start heating the water. The working team felt that cooking congee by steam had the following advantages:

(a) It was exceptionally saving of fuel.

(b) It was clean.

(c) Food did not burn or stick to vessels, and the vessels were more easily kept clean.

(d) Pottery *kongs* were more easily obtainable than metal cooking vessels which were at a premium in a community where they were sold for income.

(e) The capacity of pottery *kongs* far exceeded that of the Chinese *kous* (cooking vessels). Thus, it was possible to prepare larger quantities at a time.

(f) The entire operation required the services of only seven servants and could be organized so that a minimum of supervision was needed.

Thus there was proof that future congee kitchens could be successfully and economically operated in the same way, giving immediate relief to many people who might not be reached in any other way.

It was decided that only the needy children under 12 years of age and the aged should be eligible for the program and that they should receive one meal each day. We had found in a number of instances of direct distribution of flour that the children and aged were often neglected and that the food or money therefrom was used by the working members of the family who needed strength to continue their work. In fact, people even felt a resentment for the old who apparently live beyond their expected life span. We overheard one refugee woman of 65 say to another, "She is 89 and she just won't die."

In addition, only members of families without furniture in their homes could receive congee, for the committee reasoned that as long as people had furniture, they could convert it to income. At first the congee was to be restricted to people living within the city walls, and later it might be expanded to include the small villages nearby. In fact, it was thought that these small villages might be in even greater need than the town itself.

The lists of needy were first submitted by the "Pao Changs" (town commissioners), then reviewed by the committee, and publicly posted. The CNRRA representative issued identification tags, one for each person entitled to receive congee, but reserved the privilege of further investigation and of making additions or withdrawals from the list. Each Pao Chang was responsible for filling in each tag with the Pao number, the name of the person, the sex, and the age. The tags were then officially stamped by the CNRRA representative and issued by roll call before the time of distribution. Each recipient was told to sew his tag to his clothing. Thus there was less temptation for the people to change tags as well as less opportunity to lose them. A schedule was established so that the people from each Pao should come together to the kitchen at a designated time. Thus No. 1 Pao was scheduled to eat at 9 a.m.; No. 2 Pao at 11 a.m.; No. 3 Pao at 1 p.m.; and No. 4 at 3 p.m.

When the congee kitchen was started, there was definite evidence that help in the way of food had been needed. People put filled bowls to their mouths too eagerly. Clothing hung in rags. There was not, however, any evidence of the acute starvation which had existed a month earlier, according to a survey made of the region before the water had receded, and which no doubt, was a more critical time from the standpoint of famine, since communication when we arrived had become more available.

The people were, however, very poor, and conditions were at a stage where help was badly needed. Future relief should be given in the following ways:

(a) Health clinics;

(b) Congee kitchens for malnourished groups;

(c) Rehabilitation of home industries;

(d) Rehabilitation of town facilities, including drainage of cesspools and improvement of sanitary conditions;

(e) Rehabilitation of agriculture.

If help is not given to these regions, there is no reason to expect that the people will endure another year, since they have now reached the point where every remaining source of income has been drained, even tools for rehabilitation have been sold.

The Nutrition Problem of Mexico[1]

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SHORTLY after the meeting of the United Nations Conference on Food and Agriculture at Hot Springs in May, 1943, representatives of the Mexican government requested the Pan American Sanitary Bureau to assist in establishing the National Institute of Nutrition of Mexico. The Massachusetts Institute of Technology Nutritional Biochemistry Laboratories were invited to undertake this project with the financial support of the W. K. Kellogg Foundation.

As a first step, personnel were trained. Three Mexican physicians came to the United States to become expert in the detection of malnutrition. At the same time, two Mexican chemists were brought to the Massachusetts Institute of Technology to be trained in the latest methods of food analysis. During their stay, 112 samples of fruits and vegetables were purchased in the public markets of Mexico and flown to Boston. All of these samples arrived within three days of collection and were analyzed soon thereafter. The results of these analyses have been published (1).

The Foundation provided funds for a complete chemical laboratory to be set up in Mexico City, where these chemists during the last two years have continued their work. To date, some 450 samples of Mexican foods have been analyzed, the majority of which are unknown in the United States and have no equivalent English name.

The data on the nutrient content of Mexican foods are interesting. The exceptional quantities of calcium, iron, carotene, thiamin, and protein found in Mexican foods suggest that it may be possible to nourish the Mexican people without the use of dairy and meat products. It is clearly evident that the foods of Mexico are, in general, more nutritious than the foods of the United States. Comparison with the data presented by the recent bulletin of the U. S. Department of Agriculture (2) will confirm this statement.

Malva is an uncultivated plant that grows in abundance on the Mexican plateau. It resembles spinach in taste, is cooked customarily in the same manner, but is more fibrous. An ordinary portion (100 gm.) of *malva*, it was found, contains approximately 40 per cent of the calcium, 90 per cent of the iron, 140 per cent of the vitamin A (as carotene), and 60 per cent of the ascorbic acid recommended as daily allowances (3) for an adult man. Several strains of *malva* have been analyzed with varying results indicating that more nutritive varieties can be expected through plant breeding and cultivation.

Charal is an inexpensive air-dried fresh water fish usually 3 to 6 cm. long which is eaten much as we eat sardines. *Charal* supplies in 100 gm. approximately 27 per cent of the protein and 155 per cent of the calcium allowances of an adult man.

Tortillas are the daily bread of Mexico. The per capita consumption of corn in tortilla in Mexico is said to average 280 gm. daily. Many people of low economic status consume as much as 700 gm. of corn in this fashion.

The *tortilla* is prepared by first mixing one part of corn with two parts of 1 per cent lime solution. This mixture is heated at about 80°C. for 20–45 min., then allowed to stand until the following day. The mother liquor is decanted from the corn which is then washed two or three times with water. The lime-treated corn (*nixtamal*) is finely ground by hand on a stone *metate* or in a power driven mill. About 50 gm. of the pulverized mass (*masa*) is then patted into thin round cakes, approximately 20 cm. in diameter and 0.2 cm. thick. These cakes are cooked on a hot iron plate (*comal*) for about 30 seconds, turned and cooked for 75–100 seconds, turned and cooked for another 30 seconds.

A series of samples of corn and the *nixtamal* and *masa* made from these samples have been studied to determine the change in nutrient content during treatment. As was expected, we found moderate losses in the thiamin, riboflavin, and niacin content (4). The calcium content had increased by 2010 per cent and the iron had increased by 37 per cent. The high calcium content of the *tortilla* resulted

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from the treatment of the corn with lime water. By this food practice, the Mexican has achieved an adequate calcium intake, for the average daily consumption of 280 gm. of *tortilla* furnishes more than 500 mg. of calcium in available form.

Another common Mexican food is the chili. Segura-Millan has reported (5) that a typical Mexican peasant consumes approximately 40–60 gm. of chili per day. Our studies have shown that chili contains between 8200–95,000 I.U. of vitamin A (as carotene) per 100 gm. (1) and averages approximately 30,000 I.U. per 100 gm. Thus, the Mexican peasant whose diet would otherwise be dangerously low in vitamin A content consumes perhaps in excess of 12,000 I.U. of vitamin A in the form of hot chili. One is tempted to conclude that the chili habit of Central America has a basis on instinct.

One of the most important items in the dietaries of these Indians is *pulqué*—a fermented drink produced from the juice of the maguey cactus which is cultivated on the plateau. When the maguey blooms, the Indian cuts out the blossom, exposing a central hollow chamber, then covers it with a large stone to keep out wild animals. He returns from day to day to collect the juice that has drained from the leaves, drawing it into a long gourd. The juice is then delivered into a pigskin bag, made with the fur inside. Presumably there are yeasts and bacteria in the fur which promote fermentation. The juice (*agua miel*) is taken to town, placed in a vat, and fermented for several days. The resulting *pulqué* has an alcoholic content of perhaps 4 per cent, has an acid flavor similar to sour milk, and is a moderately thick, opaque, white liquid. In some areas of Mexico *pulqué* is consumed in intoxicating amounts. In arid areas it undoubtedly serves as an important source of water.

Pulqué, surprisingly, is actually an excellent food. The seven-day diet records of 100 Otomi Indians selected according to the age and sex distribution of the total group studied, indicated that *pulqué* ranks next to *tortilla* as the most important food item in the dietary (11). Several years ago an attempt was made to prohibit the manufacture of *pulqué*. It has been reported (6) that this prohibition impaired the health of the people in arid areas and was soon removed.

Two of the physicians trained under this program returned to Mexico and participated in a survey to determine with us the nutritional status of 1000 school children before and after they had been given school luncheons (7). These lunches were compounded on the basis of the food analysis data which we had assembled.

A series of five menus were used in rotation; each luncheon was calculated to contain one third the nutrient allowance of a 12-year old child in accordance with the National Research Council recommendations (3). All foods in the luncheon were native to Mexico and were in the common diets of the people. These lunches cost less than one fifth as much as lunches containing typical U. S. foods.

The children in this study came from family groups comprising five to seven persons, with an average income of about 20 cents per day. Recently (7) we published the results of the initial examination of the 500 girls and 500 boys in this study. They were examined by biomicroscope in an attempt to measure the extent of avitaminosis A and ariboflavinosis. Blood cell volume, hemoglobin, plasma, ascorbic acid, and serum albumin content were estimated. There is considerable disagreement among investigators as to the exact interpretation of some of these measurements. Thus, it is difficult to assess the extent of malnourishment. However, the same group of technicians using the same procedures had previously studied 760 middle class children in Michigan. A comparison of the Michigan data with the Mexico City data should, therefore, be valid. The poverty-stricken Mexican children showed evidences of a nutritional status superior to that of the middle class Michigan children, except for the hemoglobin values.

The International Division of the Rockefeller Foundation has conducted several surveys in Mexico. In 1944, Robinson and others (8) reported the results of a study of 88 families and 263 individuals living in one area of Mexico City. This group included a cross section of persons of different economic and social levels. The information collected indicated that, whereas very few of the people studied received an ideal diet as judged by recommended daily allowances (3); nevertheless, the incidence of detectable malnutrition was very low.

Calvo *et al.* (9) published the results of a study of 413 persons who were eating in the government-operated communal dining room. When compared with the recommended allowances, the diets of these people before admittance to the dining room were calculated to be markedly low in all nutrients, with the exception of iron and thiamin. These people were then fed nutritious restaurant meals for 18 months, at the end of which time physical and clinical examination revealed little if any improvement in nutritional status. Either these people were not malnourished or the methods for detecting malnourishment need considerable improvement. There are unpublished data reporting a study by Calvo *et al.* (10) of a group of people living in Capula, a city located 12 miles from Morelia and 200 miles from Mexico City. The diets consumed by 48 families made up of 198 people indicated that they received a deficient intake of riboflavin, vitamin A, and ascorbic acid, yet the clinical findings indicated a low incidence in deficiency states.

It has been pointed out that clinical and biochemical surveys determine the quality of nutrition

but do not determine whether the subject is getting enough food (2). In many parts of Central America, in villages where life is a continuous struggle, the children sit about the market place, playing with a toy that demands no physical effort; they are docile and quiet—"model" children from a parent's viewpoint. They are in marked contrast to children in the United States who are restless, boisterous, bursting with energy. Why is there this difference? In part it is the result of infestations; in part it is the effect of climate; in part it must be due to undernourishment—to hollow hunger. Recent clinical research has shown that balanced starvation will not result in malnutrition—in the appearance of histological and biochemical lesions. Thus, the absence of these lesions is no assurance that the subject is well nourished.

The author believes there are three hungers that must be satisfied before man can be judged well nourished. These hungers have been called: hollow hunger, hidden hunger, and humdrum hunger (11). Hollow hunger means an empty stomach, insufficient food, undernourishment. Hidden hunger means malnourishment, unbalanced nutrition, vitamin, mineral, or amino acid deficiency. Humdrum hunger means unattractive food, unpalatable food, unvaried diets, a psychological malnourishment. Hollow hunger is reflected in height and weight tables; hidden hunger is detected in clinical lesions; and humdrum hunger is observed in the spirit of the people. People should be considered as starving until these three hungers are satisfied. The nutrition problem of Latin America, I believe, is mainly hollow and humdrum hunger.

In another study recently published, Anderson *et al.* (12) studied the nutritional status and food habits of Otomi Indians in Mezquital Valley, about 70 miles north of Mexico City. The foods consumed by these Indians were analyzed by us. The Mezquital is a desert area in which few plants grow because of the months of drought, yet human beings live in this area and find sufficient sustenance to survive from generation to generation. Calculation of the nutrient intake of these people indicated that the diet was slightly low only in calcium, riboflavin, and niacin content. The diet contained more than 70 per cent of the recommended allowance of all nutrients except riboflavin. Clinical examination of all people in several villages revealed very little clinical incidence of malnourishment. The Otomi Indian has demonstrated that human beings can be well fed even in the most desolate areas.

As a result of our experience in Mexico we have established several tentative principles to guide us in attacking the nutrition problems. We realize that more experience may modify some of these observations but they have been presented to help guide those actively concerned with the food problems of other countries (13).

First, we recognize that the food pattern of each country may be different and that the solution of the nutrition problem of each country may be found in the proper use of its own food resources.

Second, we recognize that good nutrition may be obtained by people living in poverty on foods unfamiliar to others.

Third, we recognize the importance of the food habits of peoples with long established food cultures, and regard them as inviolable until they have been carefully analyzed.

Fourth, we are convinced that the analysis of all food plants must be the first step in the development of a sound nutrition program in any area.

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Correction

On page 597 of the July issue of the JOURNAL an error appeared in Table 5. The unit of measurement for biotin should read *mcg.* rather than *mg.*

A Recent Dietary Study of a Rural Community in Greece[1]

HELEN HALLEY[2]

THE DIETARY histories used in this study were collected from 10 families in a small rural community in Greece—the community of Enosis on the Island of Cephalonia. Each of the 10 families represents a different social, economic, and occupational status, as will be seen by studying the case histories at the end of this paper. It is hoped that this sampling, though limited in number, will give an understanding of the food patterns and problems in certain rural areas of Greece, especially during periods of inflation and food scarcity. The descriptions given here cannot be considered as typical of the diets of these people in normal times.

The Island of Cephalonia is one of the Ionian Islands, located in northwestern Greece almost at the mouth of the Adriatic Sea. The community is primarily agricultural with the principal crops for domestic consumption being: wheat, barley, oats, a great variety of legumes, cheese, milk, some honey, various fruits, almonds, vegetables, and some tubers. Goats and sheep constitute the most important livestock, providing meat, dairy products, wool, and skins. Pork is also included in the dietary. However, curing methods are unknown and when pigs are slaughtered, there is much waste, especially of the fats. This lack of knowledge of curing methods and inability to use the whole animal explains in part the lack of any significant amount of pork in family menus.

Every peasant, with few exceptions, owns his own home, a garden, and some farm land. The size of the house varies with the economic condition of the family, but the majority have a cellar and separate chicken or storage house where, in addition to chickens, the other animals, tools and feed are kept. Some varieties of vegetables are grown during the winter, others during the summer so that vegetables are available the year round. The most common garden trees are lemon, fig, and almond.

Generally, farm land is not in a single plot, but is composed of small patches in different localities; for example, one "stremma" (0.247 of an acre) might be wheat land and be located in a small valley, another half stremma might be in a terraced vineyard elsewhere, or still another might be a strip along a hillside, good for grazing of goats, sheep, and other animals but not suitable for cultivation.

The main meal of these people is served at noon; there is usually an afternoon snack or drink taken after school between 4 and 5 o'clock, and a light supper is served between 8 and 9:30 in the evening.

Legumes form the main dish of the mid-day meal. There is a great variety of dry legumes, but because lentils are most commonly used, all figures are based on this variety. Lentils are boiled in water with a head of garlic, a sprig of thyme (*T. vulgaris*), and salt. They are served with olive oil and vinegar. Olive oil is the only fat available and is used both in cooking and for seasoning.

An endless variety of greens, both cultivated and wild, are used freely. Many varieties are very bitter and must be mixed with sweeter ones. Irregardless, all greens are boiled in water to which salt has been added. This water is usually discarded after cooking. Served with olive oil and lemon juice or vinegar, the greens form the main dish of the evening meal; often a little cheese, herring, sardines, or fried fish, bread, and a small glass of light grape wine supplement the meal. Children from the age of six years are given about an ounce of wine diluted with water.

Almost all milk and other dairy foods come from the goat and sheep. The sheep's milk is very rich and is used to make cheese, whereas goat's milk is further utilized in cooking and drinking. Cheese is often used for bartering (1 lb. of cheese is worth 3 lb. of wheat) since money has had little or no value during the last few years. All milk is boiled and taken hot with bread in the morning. A little coffee and sugar are added when available.

Bread is made from stone-ground wheat flour mixed with barley or sometimes (during the war

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TABLE 1

One week's menus for Family B

MORNING	NOON	AFTERNOON	EVENING
		Wednesday	
1 cup milk 1 slice bread*	1½ cups vegetable stew** 1 slice bread	1 slice of bread and olive oil† for all children	Greens and olive oil Bread
		Thursday	
Same	1 slice bread 1 fried egg	1 slice of bread and olive oil Small piece of cheese	Same
		Friday	
Same	1 cup lentils†† Olive oil Bread	1 slice of bread and olive oil	Same
		Saturday	
Same	Potato and onion stew** Bread	Same	Greens Olive oil Smoked herring‡ Bread
		Sunday	
Same	1 fried egg Salad Bread	1 slice of bread and olive oil Small piece of cheese	1 cup crushed wheat with milk
		Monday	
Same	1 cup beans Olive oil Bread	1 slice of bread and olive oil	Greens Bread Olive oil
		Tuesday	
Same	Vegetable stew** Bread	Same	Greens Bread Olive oil 2 salted sardines‡‡

* Average daily bread consumption for family, 3½ to 4 lb.

** Stews are made with tubers, olive oil, tomato paste, salt, and pepper. In the vegetable stews, a variety of green vegetables are substituted for the potatoes.

† Average daily consumption of olive oil by the family, ¾ pt.

†† 1½ lb. dry lentils to a meal for the family.

‡ Herring is often roasted over live coals. The skin is discarded and a little olive oil is poured over the meat. One to two herrings are served to seven persons in one meal.

‡‡ Salted sardines are washed first with water then with vinegar, after which olive oil is added. Two to three sardines to a serving is the average. There are approximately 20 sardines to a lb.

years) with oats. All grains are ground in the old style, local windmills. Bread is baked once a week at home on a hearth oven. The only ingredients added are: salt, water, and an old piece of dough kept from the previous baking which provide the yeast. This old dough is kept in an open porcelain bowl in which some olive oil is put. During the season two or three grapevine leaves are washed and placed over it. This small piece of dough is called *prozimi*, a word derived from "pro," meaning previous or first, and "zimi," meaning dough.

The night before baking the *prozimi* is dissolved in warm water to which flour is added. It is thoroughly mixed, then kneaded, and left to rise. Early the next morning this dough, which is called "the big *prozimi*," is once more dissolved in water to which salt and flour are added and again kneaded into a dough which is the regular *zimi*. It, too, is

covered and left to rise for about 2 hr. Then chunks are cut and kneaded into round loaves, each of which is placed in a square wooden tray.

This tray, usually 48 by 24 by 8 in., is divided into 18 squares. A cotton cloth, sprinkled with flour to prevent the dough from sticking, is loosely placed over it. Thus each loaf as it is dropped into its section is surrounded by cloth. The cloth has two purposes: first, sanitation, and second, it facilitates the removal of the loaves when ready to bake. Each loaf is lifted out by pulling up the loose end of the cloth closest to the loaf. The loaf is then put on a wooden peel blade, shoved into the oven, and dropped on the hot hearth where it is left to bake for about an hour. Then the baked bread is taken from the oven with the peel blade. Each baking produces an average of 18 loaves weighing about 3 lb. each. This bread is not of the best texture and palatability, but is wholesome and rich in minerals and some of the vitamins, especially the B-complex.

Table 1 shows the menu for a week for one of the 10 families studied. This family group consisted of the father—a former proprietor of a small variety store which at present is not earning enough to buy the allotted "health food ration"—the mother, four sons and one daughter, ranging in age from nine to 18 years. A more complete picture of this family may be found in the case histories at the end of this paper. The menu of this family although containing an average of only 1473 calories per day per person is somewhat more interesting than the majority of menus submitted because some variety of foods is shown. In another menu, typical for its monotony, for instance, the morning meal for all seven days consisted of one slice of bread with olive oil. The evening meal each day was composed of greens and olive oil, plus one slice of bread. There was little more variation shown in the noon meal. Table 2 presents estimates of the quantity and quality of the dietaries of each of the 10 families.

It is interesting to note that, even with such low daily diets, children frequently received supplements which were not considered in estimating food values. The six-year-old girl of Family A received 1400 gm. of milk, which was not included in the figures cited, and she alone of the family received an afternoon snack consisting of one slice of bread with olive oil. The adults in Family B also were excluded from the afternoon repast. Family I also made it a point to provide extra foodstuffs for the children. In the afternoon they were given a handful of raisins, of somewhat doubtful value, for because of their poor quality and unsanitary preparation, the children suffered often from dysentery. The children of Family I also enjoyed an egg each on two days of the week studied.

DISCUSSION

A total of 56 persons were represented in this sampling. There are 35 children—23 boys and 12 girls, ranging in age from 9 days to 18 years. Of the total group, 33 were males and 23 females, which was significant since the caloric requirements, as a general rule, are greater for men than for women. The total average calories per day for each individual over three years of age varied with the number of individuals in the family and also with the father's occupation and the general family economic situation.

The foodstuffs which furnished the major part of the calories in these diets as shown in Table 3 were: (a) bread, which supplied 49.6 per cent of the total calories; (b) olive oil, 21.4 per cent of the total calories; and (c) legumes, 12.7 per cent of the total calories. These three foodstuffs provided 83.7 per cent of the total calories, while bread and legumes were the greatest sources of proteins.

The adults of this group were all engaged in "very active" work. It is, therefore, obvious that the amount of food consumed by these people was markedly inadequate. The consequences of this undernourishment was evident in the susceptibility of the people to epidemics, parasitic diseases, and tuberculosis. There was a high incidence among the children of an inflammation of the lymphatic glands of the neck which frequently results in a form of tuberculosis of these glands and leaves its marks externally in the form of scars, but which has much more serious effects in the developing child and his general health than mere external scars.

Calculations of vitamin and mineral content of these diets were not included because the study was focused on the adequacy of general food supply and staples. However, it may be said with some degree of certainty that these diets are deficient in calcium. Wheat is a rather poor source of this mineral; since bread and olive oil—which contains no calcium—furnish 71.0 per cent of the total calories, there is little left which could supply the necessary requirements of this mineral. Many varieties of greens are good sources of calcium, but its degree of assimilation in the body depends to a great extent upon the combination in which it occurs. Furthermore, substantially all water soluble minerals and vitamins are wasted because of the cooking habits of these people.

Since these data come from a rural area where every family possesses a home, garden, some animals, and farm land, it must be understood that these diets cannot be regarded as standards in figuring urban dietaries. Urban diets are much poorer, both in calories and in type of foodstuffs. This can be easily illustrated by the government employees included in this study. The teacher's salary is equivalent to about 15 lb. of meat per month at present prices. The estimated cost of the food for

TABLE 2

*Weekly per capita food consumption of persons over three years of age**

FOOD	QUANTITY	CALORIES	PROTEINS		FATS		CARBOHYDRATES
			Animal	Vegetable	Animal	Vegetable	
Family A**							
	gm.		*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
Bread	3178	7786		308.3		28.5	1579.5
Olive oil	350	3150				350.0	
Greens†	1050	315		25.0		3.5	42.0
Lentils	203	714		53.0		2.1	120.1
Wheat (whole crushed)	140	504		14.7		2.3	105.7
Milk††	490	336	16.2		19.6		24.5
Egg (1)	50	74	6.7		5.3		
Total		12,879	22.9	394.0	24.9	386.4	1871.8
Family B							
Bread	1595	3020		154.7		14.0	790.2
Olive oil	300	2700				300.0	
Greens	1050	315		25.0		3.5	42.0
Legumes‡	400	1396		103.8		4.0	236.8
Wheat (whole crushed)	70	252		7.3		1.2	52.8
Milk	1600	1104	52.8		64.0		70.0
Eggs (2)	100	148	13.4		10.6		
Potatoes	100	85		2.0		0.1	19.1
Cheese‡‡	50	205	12.2		17.2		0.3
Herring	33	47	6.4		2.3		
Sardines	44	139	8.5		11.2		
Total		10,311	93.3	292.8	105.3	322.8	1211.2
Family C							
Bread	1589	3893		139.6		14.0	790.0
Olive oil	300	2700				300.0	
Greens	1575	472		37.5		5.0	63.0
Legumes	200	698		51.4		2.0	118.4
Milk	1400	966	42.2		46.0		70.0
Egg (1)	50	74	6.7		5.3		
Cheese	100	410	24.4		34.4		0.6
Olives	50	175		0.9		12.5	2.1
Total		9388	77.1	229.4	85.7	333.5	1044.1
Family D¶							
Bread	2840	7958		273.5		25.6	1411.5
Olive oil	200	1800				200.0	
Greens	1575	472		25.1		5.0	63.0
Milk	1400	966	42.2		46.0		70.0
Eggs (3)	150	222	20.1		15.9		
Cheese	50	205	12.2		17.2		0.3
Total		11,623	74.5	298.6	79.1	230.6	1544.8
Family E							
Bread	1250	3063		121.3		11.3	621.2
Olive oil	200	1800				200.0	
Greens	1050	315		25.0		3.5	
Legumes	800	2792		205.6		8.0	473.6
Milk	1400	966	42.2		46.0		70.0
Fish	100	71	17.2		0.3		
Meat	162	233	34.5		12.9		
Total		9240	97.9	351.9	59.2	222.8	1206.8
Family F							
Bread	1595	3920		154.7		14.0	790.2
Olive oil	250	2250				250.0	
Greens	1575	472		25.1		5.0	63.0
Legumes	200	698		51.4		2.0	118.4
Olives	200	500		3.4		50.0	8.6
Noodles	200	180		6.0		3.0	31.6

TABLE 2—*Concluded*

FOOD	QUANTITY	CALORIES	PROTEINS		FATS		CARBOHYDRATES
			Animal	Vegetable	Animal	Vegetable	
Family F—*Concluded*							
	gm.		*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
Meat	162	365	31.1		26.5		
Cheese	50	205	12.2		17.2		0.3
Total		8790	43.3	240.6	43.7	314.0	1012.1
Family G¶¶							
Bread	4544	11,113		440.8		40.1	2265.0
Olive oil	200	1800				200.0	
Greens	1050	315		25.0		5.0	42.0
Legumes	800	2792		205.6		8.0	473.6
Cheese	50	205	12.2		17.2		0.3
Olives	100	250		1.5		25.0	4.3
Meat	200	450	38.4		33.0		
Eggs (3)	150	222	20.1		15.9		
Milk	1000	690	33.0		40.0		70.0
Total		17,859	103.7	672.9	106.1	278.1	2785.2
Family H							
Bread	3178	7785		308.3		28.7	1479.5
Olive oil	200	1800				200.0	
Greens	1050	315		25.3		3.5	42.0
Legumes	800	2792		205.6		8.0	873.6
Milk	1400	966	42.2		46.0		70.0
Cheese	50	250	12.2		17.2		0.3
Olives	50	175		0.9		12.5	2.1
Meat	200	450	38.4		33.0		
Fish	200	142	34.4		0.6		
Total		14,675	127.2	540.1	96.8	252.7	2067.5
Family I							
Bread	2386	5846		231.4		21.5	1121.0
Olive oil	200	1800				200.0	
Greens	1575	472		25.1		5.0	63.0
Legumes	600	2094		154.2		6.0	355.2
Milk	800	552	26.4		32.0		40.0
Fish, canned§	100	190	20.8		11.2		
Meat, canned§§	100	274	26.3		18.7		
Total		11,228	73.5	410.7	61.9	232.5	1579.2
Family J***							
Bread	2724	6674		264.9		24.5	1356.7
Olive oil	450	4050				450.0	
Greens	1000	220		16.0		3.0	29.0
Legumes	454	1584		116.7		4.5	268.8
Milk	933	644	20.9		37.3		46.7
Meat	227	511	43.6		37.5		
Cheese	227	931	55.4		78.1		1.8
Sugar	28	112					28.0
Total		14,726	119.9	497.6	152.9	482.0	1731.0

** Extra milk for six-year-old girl per day was not figured in the general average.

† Based on figures for chickory, dandelions, endive, and mustard greens.

††Based for figures for cow's fresh, whole milk.

‡Based on figures for lentils.

‡‡Based on figures for Cheddar cheese.

¶Only four persons included in averages, although there were six persons in the family.

¶¶Only two adults included in averages, although there were also two daughters.

*Averages do not include children's extra foodstuffs. Bread was figured at ¾ lb. per day per adult, ½ lb. for the children.

§ Figures based on canned salmon.

§§ Figures based on canned beef.

*** Honey and wine were not included in these figures.

the mail carrier's family amounts to 290,000 drachmas, while his salary amounts to only 102,000 drachmas per year. According to these figures, if these families were to depend upon their small wages alone, as in the case among the small wage earners of all urban areas of Greece, the average calories per day could not reach the 50 per cent mark of the totals included in Table 3, inadequate as they are.

TABLE 3

Percentages of constituents of present-day rural Greek diets

INDIVIDUALS OF FAMILY	AVERAGE PROTEINS PER DAY	AVERAGE CALORIES PER DAY	PERCENTAGE OF TOTAL CALORIES FURNISHED BY BREAD	PERCENTAGE OF TOTAL CALORIES FURNISHED BY OLIVE OIL	PERCENTAGE OF TOTAL CALORIES FURNISHED BY LEGUMES	TOTAL PERCENTAGE OF DIET PROVIDED BY BREAD, LEGUMES, AND OLIVE OIL
	gm.					
A*	59.6	1840	60.4	24.5	5.5	90.4
B	40.9	1473	29.3	26.2	13.5	69.0
C	43.8	1341	41.5	28.7	7.4	77.6
D**	53.8	1660	68.5	15.4		83.9
E	63.3	1320	33.1	19.5	30.2	82.8
F	40.6	1256	44.6	25.6	8.0	78.2
G	110.9	2551	62.3	10.0	15.6	87.9
H	95.3	2096	53.0	12.2	19.1	84.3
I†	83.5	1604	52.0	16.0	18.6	86.6
J‡	88.2	2103	45.3	27.5	10.7	83.5
Average	67.9	1724	49.0	20.6	12.9	82.4

* Six-year-old girl's milk not figured in averages.

** Only four persons out of family of six included in averages.

† The above averages do not include children's extra foodstuffs.

‡ Honey and wine were not included in averages.

It is only with such comparisons and points in mind that this study might be used to give a glimpse of the starvation conditions in urban areas, and the present-day marked inadequacies in the food of the rural areas in Greece.

CASE HISTORIES

Family A. Members of the family are: father, 47 years of age; mother, 40; three daughters and one son, ranging in age from six to 18 years, and a baby boy, three months old. The father is an unemployed merchant seaman.

Property consists of a three-room house and garden; three goats; one sheep; four chickens; eight olive trees; and ½ stremma of land, equivalent to ⅛ of an acre.

The family income is derived from a government subsidy of 11,000 drachmas (equivalent to $2.20 present dollar value) per month, plus a small income derived from the land. The annual yield consists of 150 lb. of wheat, some vegetables, milk, and cheese, the greatest part of which are sold or bartered. During the cultivation season, the father and eldest son, 18 years old, work for a daily wage in the community, but work is not regular.

General health conditions of the members of the family is poor. The 13-year-old daughter suffers from an ear ailment, and the family generally is undernourished. There is little or no medical care.

Family B. There are seven members of this family: the father, age 62; the mother, 40; four sons and a daughter ranging in age from nine to 18 years. The father is the former proprietor of a small variety store, which because of war conditions, exorbitant prices, and scarcity of merchandise does not earn enough to buy the allotted "health food ration." The girl, 17 years old, helps at home, while the three younger boys go to school.

The family owns a four-room house and garden. One room of the house is used for the variety store. There are 3 stremmata (plural of stremma) of farm land and ½ stremma of vineyards, which yield annually about 480 lb. of wheat, some legumes, garden vegetables, some raisins, wine, and olive oil. The family owns one goat, plus four olive trees.

There are no apparent signs of ill health.

Family C consists of six members: the father, age 49, normally a mason but now a laborer in a flour, windmill; his wife, 37; and four children, three girls and one boy. Two girls, ages nine and seven, are in school, while the younger children—a girl, five years old and a boy, three—are at home.

The family owns and lives in a small three-room house. Additional property consists of 4 stremmata of wheat and legume land; 2 stremmata of vineyards, and a small garden. There are 15 olive trees, two goats, and three chickens. The annual yield from the land is normally about 450 lb. of wheat and legumes, wine, raisins, and olive oil. Some of the produce is sold or bartered, but in all these transactions there is little money exchange.

No apparent signs of ill health are evidenced.

Family D. This, too, is a family of six persons: the father, age 42, works in a tobacco factory in Pereus and sends money home. The mother is a housewife and cares for three sons who are at home, ages three, nine, and 19. There is another boy, age 14, who is in school away from home.

Property consists of a small home and garden, seven olive trees, 4 stremmata of poor farm land, two goats, and four chickens. The father sends money home to buy "the health food ration." The only food in this family's dietary which was adequate was bread. In spite of this, the children appear to be very healthy.

Family E. Members of this family are: father, age 45, the owner of a small cafe; the mother, age 40; three daughters and two sons. The two eldest daughters, ages 16 and 14, help their mother, while the sons, ages 13 and seven, and the girl 10, are in school.

Family property consists of a small home—three or four rooms—and a garden with a few olive trees; a small plot of wheat and legume land; five chickens; four goats; and a horse. Although the father operates a cafe, he does not own the building. The quantity of bread was not sufficient. However, the general health of the family appeared to be good with no apparent illness.

Family F. A family of seven persons: the father, age 52, is a truck and passenger car driver, while the mother, 40, is a housewife. There are five sons, ranging in age from seven to 18 years. Three are in school.

Family assets are composed of a five-room house and garden; ½ stremma of farm land; three olive trees, two goats, six chickens, and a half interest in a truck and a passenger car. The income is irregular, varying with the season, traffic, and general economic conditions in the community and neighboring districts.

The general health is very bad. The boys 15 and 13 years old were stricken with infantile paralysis a little over a year before this study was made. The 15-year-old boy still had "pains in his hands." One of his legs still "runs"; there apparently is a lesion. He is very much underweight and very badly nourished. The boy of 13 has

an atrophic leg and limps badly. The mother is also in rather poor health and often ill.

Family G. This is a young family, the father and mother being 26 and 23 years of age respectively. There are two children, a two-year-old girl and a new-born daughter. The father is a farm laborer.

Although young, the family owns about as much property as the other families of this study: a four-room house with a basement and garden; one goat, six chickens, and some olive trees. The annual yield from the land is about 840 lb. of wheat, barley, and legumes, as well as 10 gal. of olive oil.

The general health seems good.

Family H. Consists of three members: the father, 38 years of age, a shoemaker; the mother, 33, a housewife; and one son, 5½ years old. This is the only family of the study which rents. In connection with the house, there is a garden. The average daily income is 1000 drachmas (value of the drachma at present fluctuates between 4800 and 5200 to the American dollar). The rent per month is 2000 drachmas. General health is not very good, and the mother is often ill.

Family I. This family consists of the father, age 40; the mother, 32; the grandmother, age 50; one daughter, four years old; and a two-year-old son. The father is a farmer and president of the community (without pay); the mother is a teacher (government employee) in the same community, while the grandmother takes care of the house.

The family owns a two-story house; a garden with various vegetables; 3 stremmata of farm land with rotation of crops —wheat and legumes; 50 olive trees; four chickens; and one goat. The cultivation is done by share-croppers on a 50–50 basis; the family receives about 80 pt. of olive oil and 240 lb. of wheat and legumes annually. (Because of the inaccessibility of chemicals for spraying, the yield of the olive trees is very low, due to the Daucus fly.)

The mother's monthly salary is 30,000 drachmas, equivalent to $6 or $7, as compared with the prewar salary of 2700 drachmas, equivalent to $21 to $25. Commodity prices are far beyond the apparent salary increase; for example, 1 lb. of meat costs 2000 drachmas, while in prewar days it cost 8 drachmas. This is the only family in the group studied which has received two packages (11 lb. each), with clothing and foodstuffs from the United States.

The grandmother suffers from rheumatism, and the father is an asthenic type and susceptible to epidemic diseases. The mother is in good health. The four-year-old daughter was born during the Italian occupation in 1941, and the mother's diet during pregnancy was very poor, consisting of a little bread made of corn and oats, a small quantity of olive oil, and greens twice a day, with nothing for breakfast. The child's development during nursing was very poor. When she was three, she developed nephritis and later ascariasis. Now she suffers from an inflammation of the cervical glands (adenitis). She is much underweight and, in general, cachectic. The boy was born during the German occupation. The mother's food during pregnancy was not quite as bad as in the previous pregnancy; wheat and a few other items were occasionally available for her diet. However, she was unable to nurse the child after the fifth or sixth month, and during the period of dentition, the baby's food was inadequate both in quantity and in quality. As a result, the child's development was arrested. He now appears to be in better health, though he suffers often from dysentery, due to some foods.

This family represents a middle class, white collar urban type, even though living in a rural district.

Family J, too, can be considered as middle class. The father, 50 years old, is also a government worker, serving as a mail and telegraph carrier. The wife, 45, in addition to house work helps to tend the animals and garden. There are two sons, one 13, the other 16 years old, both of whom go to school.

The family owns a small home and garden; 5 stremmata of vineyards; 6 stremmata of wheat, legume, and hay land; olive trees; a cow; a horse; two goats; 14 rabbits; 17 chickens and a few chicks; and 40 beehives. In addition to his work as a mail and telegraph carrier, the father during free hours works in his small truck garden. Each beehive, if the spring is good, yields about 20 lb. of honey.

Annual family income amounts to approximately 1,022,000 drachmas, only about one tenth of which is derived from the father's slary. Other sources of income are: the garden, beehives, vineyards, chickens, rabbits, the horse, and olive oil. Annual expenditures have been estimated at 1,140,000 drachmas, a deficit of 118,000 drachmas over income. This family is considered to be self-supporting and exceedingly industrious, but they all work very hard. The greatest expenses are clothing and food. Clothing for a year costs 250,000 drachmas, as compared to the father's annual salary of 102,000 drachmas. Food costs even more, 290,000 drachmas.

The health of the family is poor. The father has suffered from rheumatism and arthritis for 25 years. Rheumatism and overwork have also taken their toll with the mother.

Mineral Oil in Foods

The high prices and the scarcity of edible oils have apparently resulted in an increased use of mineral oil in foods. Attention has been called recently to the occurrence of fecal incontinence due to the ingestion of excessive quantities of mineral oil by unsuspecting patrons of restaurants where mineral oil has been substituted for edible oils in salad dressings. The Council on Foods and Nutrition called attention to the harmful effects of mineral oil in foods in the following paragraph:

> It has been shown that the ingestion of liquid petrolatum is capable of interfering seriously with the absorption of carotene, vitamin D, calcium, and phosphorus, and vitamin K. The effects of its prolonged use have not been thoroughly investigated, but there is sufficient evidence of possible harmful effects to justify the conclusion that its indiscriminate use in foods or in cooking is not in the interest of good nutrition, and any such use should be under careful supervision of a physician.

In reply to inquiries about the legality of mineral oil in salad dressing, the Food and Drug Administration has expressed the opinion that "mineral oil salad dressings must be regarded as adulterated under the Federal Food, Drug and Cosmetic Act under any form of labeling employed." Mineral oil should certainly not be used except under the supervision of a physician familiar with with the problems involved and should not be used indiscriminately in foods.—*From Current Comment, J. A. M. A. 131: 1426, 1946.*

Wartime Food Rationing in the Netherlands[1]

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According to the recent *World Food Survey* made by the FAO, the Netherlands was one of the best fed nations of the world in the prewar period, enjoying an average of 2958 calories per day. This abundance of food is shown not only by the caloric value of the average food intake, but also by the variety and quality of the food available. It is less generally known and often forgotten that the Netherlands depended to a great extent on imports of foodstuffs to maintain this standard.

After the outbreak of war, food imports became increasingly smaller, and after the German occupation in 1940 ceased entirely. Thus, after May of that year, the Netherlands was forced to rely entirely on accumulated stocks of food and raw materials and domestic production. Conditions brought about the necessity of shift in emphasis in agricultural production, resulting in the curtailment of production of some first class protein foods and encouragement to the growing of potatoes and grains. More potatoes, rapeseed, and rye were produced. In this way, it was possible to raise the level of internal food production sufficiently that the danger of immediate starvation was avoided even though food imports had ceased.

Calculations have shown that under the best possible conditions the Dutch soil could provide an average of about 2000 calories per person per day. Naturally, as the situation changed, the food supply deteriorated and the quality of the normal intake became poorer than before the war. This was indicated by the increased consumption of carbohydrates and the decreased use of protein and fat.

Even before the war, the Dutch government had established an office whose duty it was to prepare a plan for handling the food supply. By August, 1939, the organization of this bureau had been completed and immediately after the German occupation in May, 1940, steps were taken to insure equitable distribution of available foodstuffs so that the nutrition of the Dutch people would not suffer. A rationing system had already been set up in 1939, under which the population was divided into five age groups, with rations distributed according to the need of the group, both as to quantity and quality. These five age groups were: infants under one year; children from one to four years; children from four to 14 years; adolescents from 14 to 18 years; and adults 18 years and over. In addition to age groupings, occupation was another factor used as a basis for grading the rations of manual workers. Extra allotments were made to those engaged in heavy work and to those who worked long hours or did night work. Extra rations were also given to those engaged in occupations harmful to their health, and special arrangements were made for the rations of sick people, pregnant and lactating women.

Under German occupation there were three phases of Dutch rationing:

(a) The period of austerity—1940 and the first half of 1941. During this time some food was rationed, but the situation was not alarming.

(b) The period of restriction—the second half of 1941, 1942, 1943, and the first eight months of 1944.

(c) The period of deprivation and starvation—from September 1, 1944 until June, 1945 in western Holland.

During the first period the stores became empty. During the second, the shops became empty; and during the third, the houses became empty.

From 1941 until September 1, 1944, an adult 18 years or older, who obtained only the bare ration could have been expected to lose weight as follows: in 1941, 10 kg.; in 1942, 20 kg.; in 1943, 25 kg., and the first eight months of 1944, 20 kg. A person forced to subsist on his rations alone would have starved by September 1, 1944—i.e., before the hunger period actually began! Everyone obtained some extra food, but the quantity varied enormously between groups and even between families of the same social group. The actual food situation cannot be understood simply in terms of rations as stated.

In addition to rationing, which was carried out by means of ration books, food was distributed through the Central Kitchens. Originally, this food was available for those groups who, either for social, economic, or financial reasons were unable to prepare their own hot meals. The Central Kitchen food

[1] This is the first of two papers on food conditions in Holland during the war. The second, dealing with the Central Kitchens, will appear in the December issue of the JOURNAL.

could be obtained only by the surrender of food coupons, but the food value of the meals was much higher than that indicated on the coupons. Starting in 1941, however, large groups of workers obtained so-called "couponless" extra food from the Central Kitchens. The food value of these meals was about 600 calories per daily portion of ¾ liter. In this way an average of 450,000 workers each day received extra food from 140 Central Kitchens spread over the whole of the Netherlands.

Many school children also received extra rations. The system of school feeding continued to operate during the first years of the war, but after some time, the shortage of milk brought it to an end.

Besides the normal distribution of food, arrangements were made for special groups to receive vitamin supplements. Pregnant and lactating women and school children were given vitamin C tablets and after some time, the occupation authorities ordered the distribution of such tablets to manual workers as well. Vitamin C tablets were available from the beginning of March through May 15. During the winter, vitamin D tablets were distributed to babies and infants. In addition to the vitamin supplement, oranges and mandarins were sometimes available and were reserved for children while here and there carotene preparations and also carrots in addition to the normal vegetable ration were given to children.

On October 14, 1939, the first rationing of food, namely sugar, began in Holland. Gradually other foods followed, and after 1940 the restricted items included tea and coffee, bread and flour, rice, butter and margarine, oatmeal, vermicelli, meat, cheese, groats, eggs, coffee substitute, milk, and on April 26, 1941, potatoes were finally rationed. After that date, nearly all available foods were rationed. Even jam, skim milk, and cocoa were later included.

Until the middle of 1943, the total caloric intake was more or less constant. After that time, the decline began, and after the beginning of 1944, the drop was much faster. As a result of the shortage of labor, farm implements, artificial manure, and the increase in smuggling, the 1943 harvest was below expectations, and in 1944 the inundation of farm land made the Dutch food situation most grave.

The composition, as well as the quantity, of the diet became progressively worse. The proportion of calories provided by carbohydrates gradually rose, while that supplied by protein and fat decreased. Until July, 1943, the decrease in the production of protein and fat had been compensated by an increase in the production of carbohydrate food. After that time, it was impossible. Generally speaking, during the first four years of the occupation, the rations were steady but the distribution of vegetables, fruit, and fish showed great local differences.

The food supply entered its most difficult period on September 17, 1944, when the railroad strike began. The "Reichskommisar" stated that if the railroad strike did not stop immediately, starvation would follow. When this threat was disregarded, he countered with an embargo as a reprisal. The embargo forbade the transporting of foodstuffs from the northern and eastern grain and potato producing areas to the western part of the country. As a result, the rationing system in the West with its highly populated areas was unable to function effectively and a serious famine followed, with an accompanying high death rate.

The reserves in the western part of Holland were soon consumed and the actual period of starvation began. More and more people were forced to leave the towns on trips to the productive regions of the East in search of food. These journeys were arduous and difficult, for they were, of necessity, made either by bicycle or on foot. Many people never returned!

During the winter of 1944–45, the Dutch people for the first (and let us hope the last) time made their acquaintance with sugar beets as a food and with tulip bulbs. The analysis of sugar beets per 100 gm. is: 1.3 per cent protein; 0.1 per cent fat; 16.2 per cent carbohydrate, and no vitamin B_1. Tulip bulbs offered per 100 gm. 3.4 per cent protein and 32.5 per cent carbohydrate. Owing to the great shortage of potatoes, the Central Kitchens in the western part of Holland were forced to prepare part of their meals with sugar beets and other vegetables instead of potatoes. In the winter months of December, 1944, January, and February, 1945, tulip bulbs were sometimes used in the Central Kitchen meals, but were obtainable by the individual only in the black market. At this time sugar beets were rationed and could be bought at the grocer's.

Sugar beets had a strong taste which was difficult to disguise in cooking and which was a real drawback in serving them. Tulip bulbs were difficult to digest and many people suffered attacks of stomach or intestinal catarrh after eating large amounts. As a matter of fact, the Dutch people prefer to see their tulip bulbs follow their natural course and flower in the fields than to see them used as an offering to nutrition!

In "fortress Holland" 5 per cent of the 4 million inhabitants, or 200,000 people, suffered from a serious disease. Doctors, dietitians, and others working in the field of nutrition noted that old people, persons living alone, infants, and little children suffered most from the food shortage. In comparison with the country, the percentage of cases in the urban communities was double. During the hunger period, the ration was so poor that it did not provide even enough calories to sustain basal metabolism.

Not all the diseases were the result of undernourishment. Other causes were anxiety and want, unusually difficult and tiring journeys in search of food, shortage of fuel in the cold season, insufficient clothing, and a shortage of soap and cleaning materials. However, there is no doubt that the

food shortage was the greatest cause of the many cases of illness. Moreover, the population had already lived under difficult circumstances for years, subsisting on a diet of about 2000 calories per day and had as a consequence less resistance.

In January, 1945, some help was given by the Swedish Red Cross. The first distribution was 800 gm. of white bread and 125 gm. of margarine per person per week. This was followed by gifts from the International and Swiss Red Cross. In this way, the extremely serious situation was to some extent relieved, and on April 20, 1945, the Allies started to drop food from the air which was soon followed by supplies brought by sea and road.

After the liberation on May 5, 1945, the Allied Forces quickly made possible an improvement in the food situation, and in less than a month raised food supplies from a ±400-calorie level to ±2300 calories per day.

Oxythiamine, a Thiamin Antivitamin, Announced

An antivitamin, oxythiamine, which brings death to mice starved for thiamin, was reported at the fall meeting of the American Chemical Society by Morris Soodak and Dr. Leopold Cerecedo of Fordham University.

Oxythiamine was obtained from thiamin by replacing the amino group of the pyrimidine fragment of the thiamin molecule by an hydroxyl group by means of nitrous acid gas. Daily injections of oxythiamine to mice, previously depleted of their thiamin stores and maintained on low amounts of thiamin, cause almost immediate loss of weight and loss of appetite. The animals assume a shabby appearance, followed by a hunching of the back and finally death in several weeks. Larger doses of oxythiamine cause the symptoms described and death in less time.

Recovery and eventual cure of this deficiency disease can be obtained by increasing the quantity of thiamin so that the ratio of oxythiamine to thiamin is less than 25 to one. This indicates that a true antagonism or competition exists between this vitamin and its antivitamin, and that the action of oxythiamine is not due to a merely toxic action.

This competition has been shown to involve the enzyme systems which catalyze almost all of the chemical reactions taking place in living beings. A large group of these enzymes are known to be composed of two essential constituents—a carrier protein and an active portion called the coenzyme. Many vitamins have been found to be coenzymes, and some biochemists believe that the role of all the vitamins will eventually be shown to act in this capacity.

In the enzyme system called cocarboxylase, this enzyme catalyzes the breakdown of pyruvic acid, one of the important products occurring in carbohydrate metabolism, to acetaldehyde and carbon dioxide. If the breakdown of this substance is prevented, the final course of carbohydrate metabolism is upset and a diverted functioning of the living organism ensues. The enzyme consists of a protein carrier and an active coenzyme group, which is prosphorylated thiamin compound. It is also known that the components of this system are not permanently bound, but that a dynamic equilibrium exists between the free parts and the effective or undissociated enzyme.

Only the complete enzyme, however, can carry out the important task of breaking down the pyruvic acid. If a condition exists which prevents the combination of the active group and the carrier, or one that causes the dissociation of the complete enzyme to an extent greater than normally exists, one would expect a greatly diminished enzyme action. Thus it has been shown that washing tissues with weak alkali will dissociate the phosphoric ester of thiamin from the protein with the result that the cocarboxylase enzyme loses its activity. It has also been demonstrated that sulfathiazole, the sulfa drug which has one half of its chemical structure in common with thiamin, also inhibits the action of the cocarboxylase. The sulfathiazole, a metabolite antagonist, is believed to act because of its chemical similarity to thiamin, by causing the displacement of the active group and the forming of an "inactive enzyme analog." This inhibition is overcome to a great extent by adding some of the ester of thiamin.

The antivitamins are also substances which are very closely related in chemical structure to the vitamin in question and are, for this reason, called vitamin analogs. Pyrithiamine and oxythiamine are two antivitamins of the thiamin group which are active against microorganisms, as well as against mice. These analogs are found to show toxicity in animals receiving low quantities of thiamine. That oxythiamine is structurally closely related to thiamin is plain, since it is obtained by substituting the hydroxyl group for the amino group of the pyrimidine fragment of the thiamin molecule

Work is being carried out to prove the displacing power of the oxythiamine. The possibility that a combination of oxythiamine, plus sulfathiazole will inhibit the cocarboxylase enzyme to a greater extent than either substance acting alone is also being studied. If this is found to be the case, it possibly indicates that antivitamins may find an important role in therapeutics by their usage in conjunction with the sulfa drugs and other biotics.

The Effect of a Relief Vegetable Protein Diet on "Normal" Human Subjects[1]

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SEVERAL possible diets have been suggested for use in feeding peoples of Europe after this war. Since relief feeding is considered only as a temporary measure, it is not necessary that a diet for this purpose be perfect in all respects. It should, however, be one that will start the starving people on the road back to health.

Investigation was undertaken by Gabby (1) using a relief vegetable protein enriched with soya flour, to determine the effectiveness of this diet on growth, development, and the maintenance of blood protein and hemoglobin levels. Gabby considered the quality and quantity of the protein as well as the overall effect of the entire diet. In the first experiments, four diets which had been prepared for food relief, were fed to white rats with a supplement of vitamin D, using *ad libitum* feeding. Three of the diets contained varying amounts of soya, while one contained wheat and peas as the only sources of protein.

Food consumption and nutritive value were carefully noted. Measure was made of growth, blood hemoglobin, total blood serum proteins, bone ash, and total liver lipids. There was a significant increase in all of these levels in the rats on diets containing soya as compared with those whose dietary protein was dependent on wheat and pea flour alone. Furthermore, all of the measurements demonstrated a direct relationship between the amount of soya used and the overall value of the mixture.

In another series of tests (2), the diet mixtures were used as sources of protein in otherwise complete diets. These diets were fed to white rats by a controlled food intake technique. Here again the amount of soya food in the diet seemed to control its value. The more soya, the better the nutrition. There were other modifications which may have affected the overall nutritive value of each diet, viz., a greater variety of vegetable material in the mixture which contained soya.

Gabby's findings indicate that the soya food product definitely enhanced the nutritional quality of the mixtures studied.

As a result, the diet found to possess the best qualities from the standpoint of nutritive value and growth of the rats was recommended as the diet to be used in the human. This diet was designated as "OFR II," and was suggested by the Nutritional Board of the federal government as supplemental feeding for our service men, as well as an emergency diet for the civilian and prison camp populations in the war torn countries. The composition of this diet is as follows:

OFR II DIET*

2 oz. wheat-soya cereal
1 oz. pea-soya soup
6 oz. stew mix
10 oz. flour (95 per cent patent white-5 per cent soya)
* All weights in terms of the dry material

To obtain further information about this diet, it was suggested that it be given to malnourished patients and that data similar to those made with rats be obtained in order to answer the following questions:

(a) Is the diet adequate in proteins and does it contain the essential amino acids to maintain the average normal level of blood proteins?

(b) What is the effect of the diet on the hemoglobin and red blood cells?

(c) Is the vegetable protein diet sufficient to maintain antibodies in the blood stream?

(d) Are there any appreciable clinical manifestations as far as the general well-being of the human subject is concerned, the ability to continue his daily work, any evidence of serious weight loss, and psychic reactions to the monotony of the diet?

(e) Is the caloric intake satisfactory to carry on one's daily work and is the diet satiating?

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[2] Aided by a grant from the Flavor Service Corporation, Chicago.

(f) Does this diet contain sufficient grams of protein to retain the level of energy coefficient requirements?

Because of present economic conditions in our urban population, malnourished individuals in the wards of our free institutions could not be found. To employ this relief diet for patients with diseased conditions in which hypoproteinemia was evident would be defeating the original purpose of the diet, for it was intended only as a relief diet to be used for a limited time, not as a therapeutic diet. It was decided, therefore, to study first the effect of relief diet OFR II on "normal" subjects as a supplemental food, as well as one that might prevent nutritional edema.

EXPERIMENTAL METHODS

Seven healthy "normal" adults, four males and three females, were placed on the diet. Two healthy "normal" adult females served as controls and remained on their regular normal mixed diet. The experimental subjects were told the purpose of the study and cooperated in every detail.

Examination of the "normal" subjects revealed that there had been no previous illnesses. They were engaged in varying occupations, and during the entire period of the experiment (six weeks for the females, four weeks for the males) they continued their daily work. Male Subject *1* was a clerk; Male Subject *2* was a gardener; Male Subject *3* was a laboratory technician and war worker; and Male Subject *4* was a laboratory technician. Female Subject *5* was a laboratory technician; Female Subject *6* was a dietitian; and Female Subject *7* was a cook. The two controls were laboratory technicians.

The laboratory study concerned itself essentially with protein determinations, for it was thought important to determine: first, whether the diet was adequate to maintain the serum protein level within the normal range; and second, if it was adequate to maintain within normal limits the hemoglobin, erythrocyte, and cell volume ratio.

Blood samples were first drawn to serve as controls and later two times a week, on the same days. The technique used in determining the total serum proteins, albumin, and globulin was that of Campbell-Hanna, modified (3, 4). The hemoglobin determinations were made by the photometric method. The erythrocyte, leukocyte, and differential blood counts were made by the usual laboratory procedures (5). The cholesterol was determined by the modified Bloor method (6, 7, 8) to observe any alterations which might have occurred due to the lack of fat in the diet. The Wintrobe tube (9) was used for sedimentation rates, hematocrit, and cell volume ratio. The serum coagulation reaction was made according to the method of Weltmann (10).

Undernutrition leads to increased susceptibility to infectious diseases, and among the several etiologic factors, a depletion of the protein reserves as evidenced by a hypoproteinemia must be considered. In a study reported by Cannon (11–13) it was shown that with patients dying of various chronic diseases, in whom total serum protein values shortly before death were 5 gm. per 100 cc. of blood or less, a serious infection or infections usually developed terminally. Thus, a simultaneous occurrence of hypoproteinemia and decreased resistance suggests a mutual relationship. In a series of experimental studies on animals made hypoproteinemic, although well nourished otherwise, Cannon has demonstrated that these animals are usually susceptible to intercurrent infections, and that these animals tend to fabricate antibodies which are proteins, specifically modified serum globulins, less effectively than well nourished animals with similar conditions. Cannon summarized his findings as follows: "When the supply of amino acids is scanty, globulin synthesis must be impaired until, with exhaustion of the protein reserves the capacity to form new globulins becomes definitely limited and concomitantly, the ability to supply protein nutriment to the bone marrow and the lymphoid organs for production of phagocytes may also diminish. When infection starts under these conditions of depletion of the protein reserves, both the capacity to fabricate antibodies and to manufacture and liberate phagocytic cells into the blood is hampered. The infectious agents thus tend to grow and spread and the infection may become quickly lethal."

It seemed advisable, therefore, in studying the effectiveness of the protein in the relief vegetable diet that antibody studies be made using as an index typhoid antibody complement, agglutination, and precipitin studies on our human subjects. The male subjects and the controls were inoculated with typhoid vaccine, while the female subjects on the experimental diet were not inoculated. Their blood samples were examined routinely for agglutination titers, complement fixation, and precipitin studies in order to study the effect of the protein in the diet in maintaining antibodies in the blood. Typhoid antibody tests were selected because these antibodies occur most commonly and the blood of the controls (those not injected with typhoid vaccine) could be used to study the qualitative and quantitative degree of the relief protein diet in sustaining the antibody level in the blood stream. From the observations recorded by Cannon and others, it was further felt that if the ingestion of protein can maintain the serum protein level, there should be no decrease or complete absence of typhoid antibodies in our experimental subjects. The typhoid agglutination tests were conducted according to the Widal technique, the complement fixation reactions using the same strain of typhoid as an antigen that was used in making the vaccine, and the precipitin studies were made by the method of Hektoen and Welker (14, 15).

TABLE 1

*The average percentage composition of the food ingredients used in the preparation of the diet**

FOOD OR INGREDIENT	MOISTURE	PROTEIN	FAT	FIBRE	ASH	NITROGEN-FREE EXTRACT
Whole wheat cereal	10.3	16.2	2.4	1.8	1.7	67.6
Quick cooking oatmeal	9.3	17.3	6.0	1.5	1.6	64.3
Soya flakes (practically fat-free)	7.8	50.9	1.1	2.6	6.2	31.4
Soya grits—16 (low-fat expeller grit)	6.0	49.2	7.0	2.8	5.2	29.8
Soya flour (low-fat expeller flour)	5.3	48.5	7.3	2.9	5.3	30.7
Soya grits 5/10 (low-fat expeller grit)	3.8	50.7	6.5	2.3	6.0	30.7
Soya flour (a full-fat flour)	6.1	41.3	20.9	2.4	5.0	24.3
Alaska peas	10.9	24.4	1.0	1.5	2.7	49.5
Garbanza-chick peas	10.3	20.5	5.0	2.2	3.1	58.9
Alaska green pea flour	8.7	23.9	1.1	1.3	2.5	62.5
Pearl barley	10.6	13.8	1.1	.8	1.1	72.6
Carrots (dehydrated)	10.7	6.2	1.8	7.3	5.3	68.7
Macaroni	12.5	14.8	.6	.5	1.0	70.6
Potatoes (dehydrated)	8.3	8.1	.2	1.9	3.1	78.4
Non-fat milk solids	3.5	35.6	1.0		7.9	52.0
Yeast	6.5	51.6	.9	2.0	8.1	30.9
Bread	35.3	12.8	1.7	.5	1.9	47.8

* Values are the average of duplicate analyses. Fruit juices were calculated from values reported by Bridges and Mattice (16).

The concentrated cereal food, dry soup mix, and concentrated stew used were prepared at weekly intervals from the same original lot of material obtained in advance and stored in a cool, dry room. The preparation and weighing of the food, as well as the "weigh back," were under the supervision of a dietitian.

Duplicate chemical analyses were made on each food ingredient and all calculations for the total caloric intake were made according to the findings listed in Table 1.

Experimental subjects received a weighed serving of fruit juice, cereal, soup, stew, and bread. The amount not consumed was weighed and considered in the calculations.

The average daily consumption of food for each subject is given in Table 2. An analysis of the food consumed is also given in Table 2. The total calories ingested are shown, together with the weight of protein, fat, and carboyhdrate, and the percentage of the total calories provided by each.

The total food intake of the male subjects was remarkably similar throughout the four-week period and no marked fluctuations were recorded. The lowest total calorie consumption during any one day, by any of the male subjects, was 1567 calories, the highest was 2396 calories.

More marked variation was observed in the female subjects where the total calories ranged from as low as 627 to as high as 2484 per day. This was largely due to wide variations in the amounts of bread and stew consumed. It is interesting that the total

TABLE 2

*Average daily consumption of foodstuffs and analysis of food intake**

SUBJECT	FRESH BREAD**	CEREAL†	FRUIT JUICE	CONCENTRATED STEW†	CONCENTRATED SOUP†	TOTAL CALORIES	TOTAL CALORIES FROM SOYA	CARBOHYDRATES		FATS		PROTEIN		SOYA PROTEIN	
								Gm.	% of total calories	Gm.	% of total calories	Gm.	% of total calories	Gm.	% of total protein
	oz.	*oz.*	*oz.*	*oz.*	*oz.*		%								
Male 1	11.99	3.79	6.00	5.51	1.00	1982	14.5	356	71.9	12.8	5.8	110.6	22.3	34.4	31.0
Male 2	12.00	3.79	6.00	5.26	1.00	1950	14.2	350	71.8	12.7	5.9	109.0	22.3	33.8	31.0
Male 3	12.44	3.79	6.00	6.24	1.00	2045	14.4	368	72.0	13.5	5.9	112.8	22.1	36.3	31.2
Male 4	12.85	4.00	6.00	5.15	1.00	2028	13.7	363	71.6	12.5	5.5	115.9	22.9	34.7	30.7
Female 5	7.25	2.00	3.67	2.82	0.95	1233	13.6	226	73.3	7.6	5.6	65.1	21.1	20.3	31.3
Female 6	3.86	2.00	3.76	7.21	0.90	1332	14.7	238	71.5	8.2	5.5	76.6	23.0	25.4	33.0
Female 7	6.00	2.00	3.85	3.30	0.89	1237	16.1	220	71.1	7.8	5.7	71.8	23.2	25.3	35.8

* All values take into account the "weigh back" of any serving not eaten.

** Figures based on fresh-baked bread.

† Figures calculated on air-dry basis as mixed.

TABLE 3

Agglutination test for typhoid

SUBJECT		6/27/44	6/30/44	7/5/44	7/7/44	7/11/44	7/14/44	7/18/44	7/21/44	7/25/44	7/28/44	8/1/44	8/4/44	8/18/44
Control 1*	T**		1–40	1–20	1–20	1–80	1–40		1–40	1–40		1–20	1–20	1–80
	A†													
	B††			1–20			1–20							1–20
Control 2*	T**					1–160	1–80		1–40	1–160		1–80	1–40	1–160
	A†													
	B††					1–20								
Male 1‡	T**			1–320		1–20		1–320		1–80	1–160			1–320
	A†			1–20		1–40		1–160		1–40	1–40			1–40
	B††			1–160	1–40	1–160	1–20	1–160		1–80	1–160	1–20		1–80
Male 2‡	T**	1–40						1–80		1–40	1–80			1–80
	A†							1–160						
	B††			1–20		1–20		1–80		1–80				1–80
Male 3‡	T**				1–20	1–80	1–20	1–160	1–160	1–160	1–160	1–80	1–80	1–320
	A†					1–20			1–40	1–80	1–40	1–20		1–80
	B††				1–80	1–80	1–40	1–80	1–320	1–320	1–80	1–160	1–80	1–80
Male 4‡	T**				1–80	1–80	1–40		1–40	1–40	1–80	1–20		
	A†							1–20						
	B††						1–20	1–80	1–40	1–80	1–40	1–80		
Female 5§	T**					1–20		1–20	1–20					
	A†													
	B††				1–20			1–20						
Female 6§	T**		1–40	1–40	1–160	1–40	1–80		1–80		1–80			
	A†													
	B††													
Female 7§	T**				1–80	1–80	1–20	1–40	1–40					1–320
	A†													
	B††					1–20								1–20

* On regular diet. Inoculated with typhoid vaccine.

** *E. typhosa.*

† *S. paratyphi.*

†† *S. schottmuelleri.*

‡ On vegetable protein diet. Inoculated with typhoid vaccine.

§ On vegetable protein diet. Controls for typhoid tests.

average daily consumption for six weeks for all the female subjects was 1270 calories as compared with 2003 calories for four weeks for the male subjects. The longer experimental period may be responsible in part for the lower total consumption by the female subjects, because of the monotony of the diet at the end of the controlled feeding period.

RESULTS

The average serum total proteins for the female subjects on the vegetable protein diet started with 6.2 per cent, dropped to 5.5 per cent, then gradually rose so that at the termination of the experiment, it was 6.75 per cent. The male subjects' average control was 5.8 per cent, reached 7.2 per cent, then dropped to 6.2 per cent, and at the end of the experiment was 6.8 per cent. The average total serum proteins for the control subjects on the regular diet was 6.7 per cent, dropped to 5.7 per cent, and at the end of the experiment was 6.77 per cent. Examination of these figures show that there is a similarity in the swing of the total serum proteins. When there was an elevation or reduction of the protein levels, these were manifested in both the controls and the experimental subjects.

The average hemoglobin for the female subjects on the vegetable protein diet started with 14.1 gm., dropped to 12.75 gm., and at the termination of the experiment was 14.2 gm. The male subjects on the vegetable protein diet started with an average of 13.2 gm., and after a slight rise, it dropped to a low of 12.25 gm. The final reading was 12.3 gm. The control subjects on the regular diet started with 14.0 gm., reached a high of 15 gm., and at the end of the experiment the reading was 14.75 gm. Examination of the averages of the hemoglobin curve show that the control subjects on the regular diet had a higher hemoglobin level than the male and female subjects on the vegetable protein diet. However, there was no indication of a nutritional anemia.

In Figures 1 and 2 are shown daily charts of two representative experimental subjects. Indicated are: results of blood determinations of total serum protein; percentage of serum globulin; percentage of serum albumin; hemoglobin in gm., erythrocytes in millions; leukocytes in thousands; total cholesterol

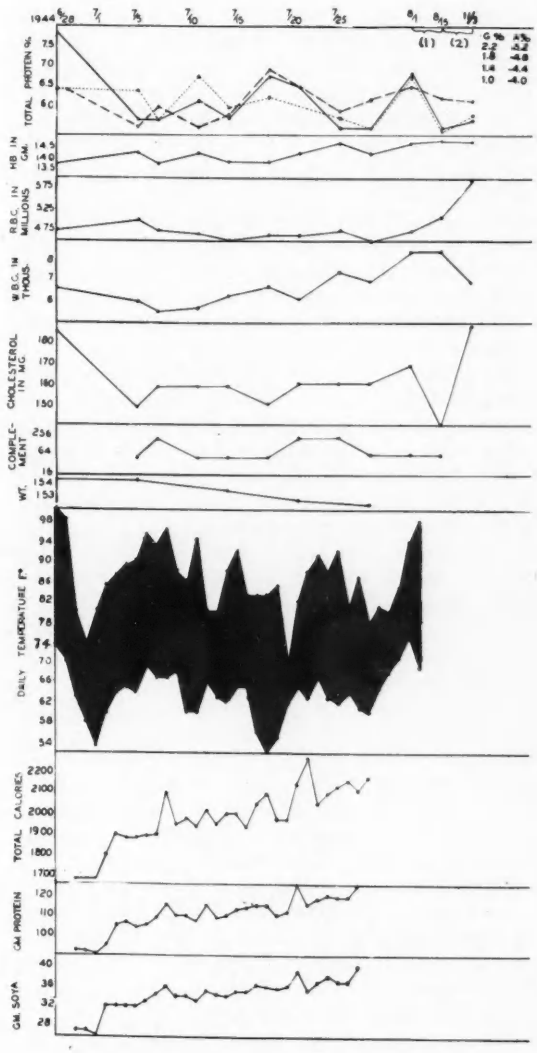

FIG. 1. *Daily chart for white male clerk, 43 years old.*

LEGEND

Total protein % = serum protein in per cent
G (to right of total protein curve) = serum globulin in per cent; also indicated by dotted line
A (to right of total protein curve) = serum albumin in per cent; also indicated by dash line
Hb. = hemoglobin in gm.
R. B. C. = erythrocytes
W. B. C. = leukocytes
Complement = typhoid complement agglutination of the blood
1 (at top of chart) = an interval of 17 days after subject returned to his normal diet
2 (at top of chart) = an interval of 11 weeks, after which a second specimen of blood was drawn

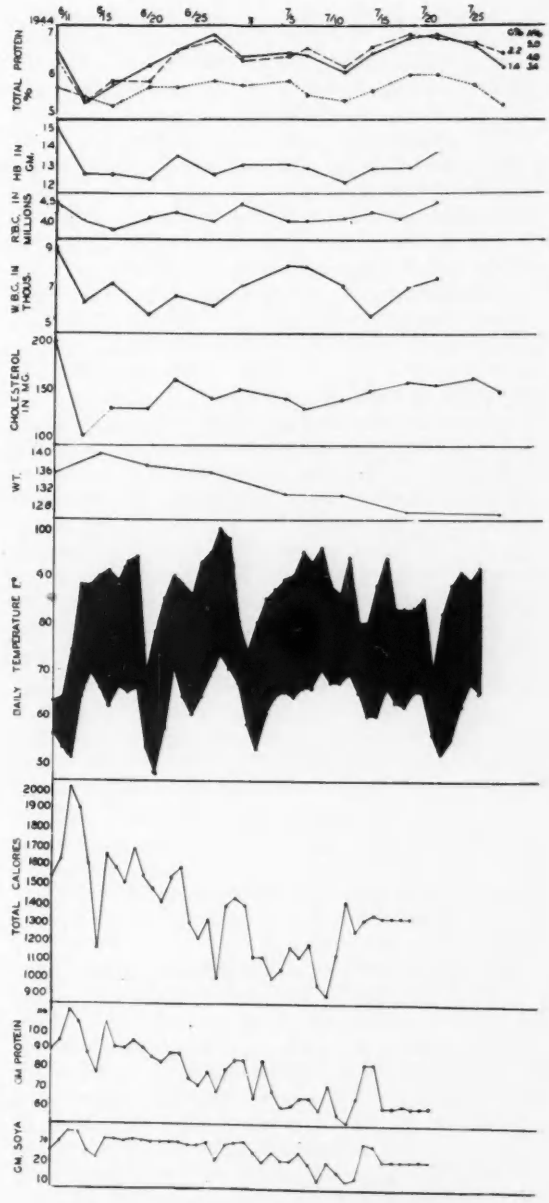

FIG. 2. *Daily chart for white female dietitian, 25 years old. See Fig. 1 for explanation of legend.*

in mg.; typhoid complement agglutination; comparision of daily temperature with hemoglobin and serum protein findings; calories; protein; and soya consumption.

Table 3, as well as the complement curve on Figure 1, shows that the typhoid agglutination tests were higher in the subjects on the relief diet than in those on a regular diet. The highest typhoid agglutina-

tion test in the inoculated subjects on the regular diet was 1–160, whereas the inoculated subjects on relief feeding gave a higher reading, up to 1–320. In fact, the control subjects (who received no vaccine but were on the relief diet) gave an agglutination test comparable to those on the regular diet and in one subject the reading was 1–320. The complement test for typhoid was within the normal range in all of the experimental and control subjects. Precipitin tests were also performed on all subjects, using the typhoid vaccine as an antigen, with negative results. It is possible that the antigen used may not be active in detecting precipitins, or that the precipitins formed following injection of typhoid vaccine may require a more sensitive antigen. More work along this line is now being done.

The sedimentation rate was determined routinely and was found to be within normal range in all of the experimental subjects. Since this was a supplemental test and the readings normal, these were not recorded on the charts.

The Weltmann serum coagulation reaction was also an auxiliary test used to detect inflammatory tissue changes. Since this test was within the normal range in all subjects, the readings are not recorded on the charts.

DISCUSSION

Although the protein requirements of a starving person are vastly different from those of a normal person, the author believes that the effectiveness of the relief diet must first be established in the normal group. The information obtained from these observations, if adequate, may then be applied to the starving group. Advanced disease conditions, aside from the value of proteins as a therapeutic adjuvant, may require more detailed clinical analysis and medical management.

The first question as to the adequacy of the vegetable protein diet to maintain the average normal blood level of proteins can be answered in the affirmative as far as the limits of the experiment were concerned during a six-week period.

At no time was the serum protein reduced to a critical level. The serum albumin and globulin levels were within their normal range and there was no evidence of a reversal of the albumin-globulin ratio. Furthermore, there has been no untoward manifestations in these experimental human subjects indicating a hypoproteinemia with accompanying clinical alterations.

Madden (17) states that the amount and quality of the food protein intake bears a direct relationship to plasma protein formation as well as to hemoglobin production and to the status of body proteins generally. Plasma protein has an important role in body nutrition in addition to its other more widely known functions, such as the maintenance of blood volume. He further mentions that normally well nourished body tissues can provide protein to the blood plasma during periods of fasting, but that the maintenance of the blood plasma level in the normal person during fasting is limited to one week or less. This experiment has demonstrated that substitute feedings, such as the relief vegetable proteins, can sustain the plasma protein level within the normal range or better.

Rose (18, 19) has contributed much to our knowledge of the role of amino acids as indispensable constituents of food. He has demonstrated that only 10 of the 22 generally recognized amino acids are essential to man. He has further shown that the exclusion of a single amino acid of the essential 10 from the food was followed by a pronounced negative nitrogen balance. He concludes that in war time when the quantities of animal proteins available for human use are so largely curtailed, the use of substitute proteins of vegetable origin can be successful only insofar as they furnish the necessary quantities of the 10 essential amino acids.

Hemoglobin which is a compound protein was used as an index along with the serum protein to study the efficacy of the vegetable proteins used in the human subjects. Figures 1 and 2 show that although there was a slight drop of the hemoglobin after the subjects went on the relief diet, there was a return to the control level and in some instances above this level. The initial drop may be due to the adaptability of the human organism to the newer diet and in this interim, there was an attempt of the organism to adjust itself to the diet with some interference in the manufacture of the hemoglobin. There no doubt are other factors, but what is obviously important is that at no time was there a serious drop in the hemoglobin, nor has it remained at a low level for any appreciable time. In fact, when the hemoglobin was elevated or reduced in the controls, there was a corresponding elevation or diminution in the experimental subjects.

Also, in none of the experimental subjects was there evidence of a marked reduction in the blood count, nor was it prolonged at a low level that would indicate an anemia. Routine differential blood counts were normal. Thus, we can conclude that the experimental human subjects fed on the relief vegetable protein diet from four to six weeks did not show a marked disturbance of their hemoglobin level or evidence of anemia.

Because of the relatively low fat content in the relief diet, the author studied the cholesterol level as an index of the effect of fat deprivation on the human subjects. All of the subjects showed a drop in the cholesterol level soon after the experiment started. Some remained at the lower level of the control for some time, then showed a gradual rise to the control level, and in some subjects the cholesterol level rose above the control level. It is obvious that because of

the low fat content in the relief protein diet, the human subjects probably utilitized the lipids from their livers and other fat depots to sustain their cholesterol level. There were, however, no clinical alterations indicative of the effects of fat deprivation.

Among other things, the sedimentation rate is closely related to the protein and cholesterol content of the blood. Also, it may parallel the leukocyte curve. In acute inflammatory conditions when the leukocyte count is elevated, there may be a corresponding increase in the sedimentation rate. Since the leukocyte counts and the sedimentation rate were within the normal range, this is further evidence that the vegetable protein relief diet was adequate within the limits of the experiment, and did not produce an acute inflammatory reaction (malnutrition) which could be detected by the tests made.

With the various tests used in detecting typhoid antibodies in the blood of the experimental subjects, the protein relief diet was adequate in the maintenance of the manufacture of these antibodies.

The author has reported in previous publications (20) that the Weltmann reactions may detect earliest exudative changes in the body. If the experimental subjects on relief diet OFR II would respond poorly by exudative changes in tissues we would detect these alterations. Since the Weltmann reaction was normal, the author believes that the components of the diet did not produce any such manifestations.

All of the experimental subjects carried on their daily work, and there were no clinical or subclinical manifestations of any nutritional deficiencies. Two subjects during the first 24–36 hr. of the vegetable protein diet complained of gas disturbance in the bowels. This may be due to a sensitivity of some individuals to the soya protein, but if this protein is ingested daily, the sensitivity disappears and there is no recurrence of gas formation. The weight loss was nominal and in no way interfered with their daily routine. There was no manifestation of fatigue, dizziness, dryness of the mouth, or weakness. Some subjects performed dreary and arduous work during the hottest days of the year.

It has been estimated that the average protein intake of food varies from 1–1.4 gm. per kg. of body weight per day, or for a man of average height and weight from 70–100 gm. per day. If the protein in the diet were composed practically of the same amino acids as the tissues of the body, about 30–40 gm. per day would be sufficient to prevent loss of nitrogen from the tissues. Such a diet is impracticable and hence a "mixed" protein diet (to provide a margin of safety and a certainty that all of the amino acids are present) should contain about 80 gm. per day.

The daily protein intake for the male subjects varied from 80–130 gm. and in the female subjects from 40–110 gm. For the male subjects this was adequate; it was slightly lower for the females. The soya proteins made up 10–40 gm. of the total protein intake. The total calories ingested daily were higher for the men than for the women, and as a rule, the male subjects could maintain a higher caloric intake. The calorie and protein curves are parallel, the higher the caloric intake per day, the higher the total proteins ingested. The caloric intake also depends on the daily air temperature. During the very warm days the experimental subjects did not wish to eat their entire weighed portions of food, but when the temperature dropped their caloric intakes rose. A comparison of the daily temperature on the charts with the daily calories reveals a parallel swing of these two curves.

The observations here recorded are essentially a preliminary study. It is obvious that many aspects of this problem must be investigated, and the observations made here repeated not only again on normal subjects, but further investigated in subjects suffering from malnutrition and starvation. These the author plans to do. Nitrogen balance studies and oxidation-reduction studies are also under way. However, from this study, it appears that the diet is adequate in proteins and essential amino acids and can maintain the average serum protein and hemoglobin levels, the antibody level to avoid intercurrent infections, prevent anemia, and maintain the general well-being of human subjects within the limits of this experiment and is thus a satisfactory relief vegetable protein diet.

SUMMARY AND CONCLUSION

(a) A relief vegetable protein diet enhanced with soya flour was used in four male and three female normal human subjects from four to six weeks.

(b) Total serum proteins including serum albumin and globulin, hemoglobin, erythrocyte, leukocyte, differential blood counts, and cholesterol were determined twice a week.

(c) Typhoid agglutination titers, complement fixation tests, and precipitin tests for typhoid were determined. These are recorded on charts and tables and discussed in the text.

(d) The diet used in these experiments, as well as the daily calories, protein, soya protein, and the ratio of fats, carbohydrates, and proteins are also recorded in the text.

From the results of these studies we conclude within the limits of the experiment that:

(a) The relief vegetable protein diet is adequate in maintaining the serum protein, albumin, and globulin, as well as the hemoglobin levels of the blood.

(b) The antibody level of the blood as determined by typhoid antibodies was adequate, and there was sufficient protein in the vegetable diet to maintain this level.

(c) There was no evidence of anemia in the human subjects during the course of the experiment.

(d) The weight loss was nominal, and there was absolutely no interference with the subjects' work or daily routine and well-being.

(e) There was no manifestation of subclinical or chemical changes indicative of a dietary deficiency.

This vegetable protein relief diet containing soya flour can be recommended as a relief diet in feeding the peoples of the war torn countries, as well as in the rehabilitation areas.

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Cheaper Cuts of Beef Contain More Amino Acids

Dr. D. A. Greenwood and Dr. H. R. Kraybill of the research laboratory, American Meat Institute, University of Chicago, reported at the American Chemical Society meeting in September in Chicago that cheaper cuts of beef are as good or better than more tender but more expensive cuts as a source of amino acids. Drs. Kraybill and Greenwood conducted experiments to determine values of the indispensable amino acids, plus two others—cystine and glutamic acid—found in some representative fresh and cooked retail cuts of beef.

Five-lb. samples of rolled chuck, rolled flank, rolled neck, rolled plate, rolled rib, and rolled rump were obtained from two choice and two utility grade carcasses. Both choice and utility cuts were cooked on racks in Dutch ovens until an internal temperature of 190–200° F. was reached. During the cooking process, oven temperature rose from 180 to 245° F.

Amino acid determinations were made by recently developed microbiological and colorimetric methods, with the following results.

(a) There was a variation in the amino acid content of the different retail cuts in the same carcass grade.

(b) Utility grade cuts usually contained slightly higher percentages of amino acids than corresponding choice cuts. This was due primarily to the fact that the utility cuts contained more lean meat and less fat. The choice cuts, however, are usually more tender and are considered more desirable than utility cuts.

(c) There was a relatively high retention of the amino acids during cooking. In some of the cuts, as much as 20 per cent of the protein and amino acids of the fresh meat, however, was transferred into the drippings during cooking. To obtain maximum nutritive value from the meat, the drippings should be eaten.

(d) All of the cuts contained all of the indispensable as well as other amino acids. The cheaper cuts are as good as or slightly better sources of amino acids than the most expensive cuts.

New Appointments, Veterans Administration

The following hospital appointments of dietitians (not previously announced) have been made by the Veterans Administration.

NAME	POSITION	LOCATION
	Branch No. 1	
Lela B. Kent	Dietitian	Sunmount, N. Y.
Dorothy Jacobs	Dietitian	Castle Point, N. Y.
	Branch No. 3	
Mary D. Findle	Dietitian	Aspinwall, Pa.
	Branch No. 4	
Anita Baker	Dietitian	Richmond, Va.
Edith Hall	Dietitian	Huntington, W. Va.
Dorothy Perkinson	Dietitian	Roanoke, Va.
	Branch No. 5	
Evelyn Gibson	Chief Dietitian	Thomasville, Ga.
Mary E. Hinton	Dietitian	Memphis, Tenn.
Victoria Jolley	Head Dietitian	Augusta, Ga.
Mert McCollum	Head Dietitian	Mountain Home, Tenn.
Gertrude McDonald	Chief Dietitian	Atlanta, Ga.
Jeanette Stanger	Dietitian	Mountain Home, Tenn.
Faye Young	Head Dietitian	Atlanta, Ga.
	Branch No. 6	
A. Eleanor Kendall	Head Dietitian	Brecksville, Ohio
Nancy Yarber	Dietitian	Cleveland, Ohio
	Branch No. 7	
Eileen Kelly	Head Dietitian	Marion, Ind.
Mary A. Patterson	Dietitian	Hines, Ill.
	Branch No. 9	
Betty Ann Darcey	Dietitian	Oklahoma City, Okla.
Margaret Haring	Dietitian	Jefferson Barracks, Mo.
Rosejoan Kisling	Dietitian	Jefferson Barracks, Mo.
Helen Smith	Chief Dietitian	N. Little Rock, Ark.
	Branch No. 10	
Gladys Holtze	Dietitian	New Orleans, La.
Helen Jennings	Dietitian	Dallas, Tex.
Gussie Miller	Dietitian	Alexandria, La.
Vera Hansky	Head Dietitian	Temple, Tex.
	Branch No. 11	
Olive E. Carlson	Head Dietitian	Portland, Ore.
Wilma Weidlein	Dietitian	Vancouver, Wash.
	Branch No. 12	
Phyllis A. Castor	Dietitian	Palo Alto, Calif.
Nell Moore	Dietitian	Van Nuys, Calif.
Agnes Reinke	Dietitian	Van Nuys, Calif.
Alice J. Stuart	Head Dietitian	Oakland, Calif.
Lorraine Walker	Dietitian	Oakland, Calif.

Promotions, Army Medical Department Dietitians

The following Medical Department Dietitians were promoted during the month of September, 1946. They are on duty in Army hospitals in this country and overseas.

Second Lieutenant to First Lieutenant

Altman, Dorothy J., R-2252
Battle, Maude E., R-2120
Clooney, Anne L., R-2144
Curran, Elaine F., R-2245
Featherstone, Alice E., R-1385
Folmar, Evelyn, R-2077
Graham, Margaret E., R-2262
Hammill, Janet A., R-2055
Henry, Charlotte H., R-2137
Hopkins, Bernice M., R-2224
Jones, Marion E., R-2161
Jones, Blanche D., R-2244
Keyes, Henrietta G., R-2200
Rugg, Susan J., R-2198
Spain, Dorothy, R-2159

Army Medical Department Dietitians Recalled to Active Duty[1]

The following Medical Department Dietitians, previously reported as separated, have been recalled to active duty.

1st Lt. Virginia M. Hopkins, R-1109
1st Lt. Merle M. Hall, R-453
2nd Lt. Norma G. Learned, R-2338

[1] The recall to active duty of 1st Lt. Mary E. Magee, R-77, Medical Department Dietitian, previously reported, has been revoked.

Army Medical Department Dietitians Separated from the Service[1]

The following dietitians have been separated under the provisions of the Separation Policy established by the Surgeon General for Medical Department Dietitians.

First Lieutenants

Case, Orlena H., R-2011, Andover, Ohio
DeBusk, Ella E., R-57, Rogersville, Ala.
Handt, Hermia M., R-1229, 1823 Wisconsin Ave., Beloit, Wis.
Hunt, Gladys V., R-2046, Gretna, Va.
Jindra, Alice M., R-56, Montgomery, Minn.
Johnstone, Rachael A., R-429, 5415 Lee Ct., Kansas City, Kans.
Jordan, Mary E., R-1399, 1725 E. Houston St., San Antonio, Tex.
Karin, Jean R., R-2034, 449 Sheffield Ave., Brooklyn, N. Y.
McCaw, Elizabeth A., R-2040, 1345 Xanthia St., Denver, Colo.
McGowan, Mary L., R-336, 306 Delaware Ave., Olyphant, Pa.
McInerney, Mary T., R-2148, 78 Park Pl., Midland, Pa.
Merrick, Leila H., R-1136, Phoenix, Ariz.
Reynolds, Helen S., R-874, 139 East Ave., Lockport, N. Y.
Scripture, Charlotte R., R-1079, RFD #2, Keene, N. H.
Shuman, Eleanor C., R-903, Monticello, Fla.
Stieg, Elizabeth M., R-2054, Baker, Mont.
Strickler, Alice L., R-1368, 1096 Emerson Ave., W., Englewood, N. J.
Tyner, Pearl, R-837, Laurel Hill, Fla.
Ulrey, Marcella M., R-2118, 408 Aylford St., Big Springs, Tex.
Walsh, Dorothy M., R-2167, Collyer, Kans.
Wells, Dorothy, R-2049, Waltonville, Ill.

Second Lieutenants

Conrad, Mary M., R-2373, Manhattan, Kans.
James, Elizabeth L., R-2024, 1 Prindle Ave., Ansonia, Conn.
MacDonald, Marian C., R-266, 645 7th St., N.E., Mason City, Iowa
Madison, Bernadine H., R-2494, Newell, Iowa
Nail, Erma H., R-1423, Kimberly, Idaho
Pearce, Andrea H., R-2079, 5 Myrtle St., Saugus, Mass.
Swanson, Lorene M., R-2052, Evans St., Freewater, Ore.

[1] 2nd Lt. Phyllis R. Radebaugh, R-1248, Medical Department Dietitian, was not separated as reported in June, 1946.

Only Eight Amino Acids Necessary in Human Diet to Maintain Nitrogen Balance

Experiments conducted in the Noyes Laboratory of Chemistry, University of Illinois, to determine minimum amount of amino acids in the diet were reported by Dr. William C. Rose at the American Chemical Society meeting in September.

Healthy young men were served diets composed of mixtures of purified amino acids, starch sucrose, centrifugated butter, inorganic salts, and vitamins. The amino acid mixtures furnished 7 to 10 gm. of nitrogen daily. Following ingestion of such diets, the subjects came into nitrogen equilibrium within a few days. Then single amino acids were omitted from the food and the effects upon nitrogen balance noted.

The results demonstrate that eight amino acids—valine, methionine, threonine, leucine, isoleucine, phyenylalanine, tryptophane, and lysine—are essential constituents of the human diet. The exclusion of each from the diet induced a pronounced negative nitrogen balance. After the experimental period, the missing amino acid was returned to the diet and was followed promptly by the reestablishment of nitrogen equilibrium.

The remaining known amino acids in the protein molecule—glycine, alanine, serine, cystine, norleucine, aspartic acid, glutamic acid, tyrosine, proline, hydroxyproline, arginine, citrulline, and histidine—are not required for the maintenance of nitrogen equilibrium in man. Evidently they can be synthesized by the organism from materials ordinarily present in the tissues.

Work is being continued to determine the minimum amount of the eight amino acid "bricks" needed in the diet, Dr. Rose stated.

Editorial

OHIO STUDENT DIETITIANS PARTICIPATE IN STATE ASSOCIATION ACTIVITIES

The Ohio Dietetic Association has successfully followed a program for stimulating student dietitians to take active part in the Association activities. A regular department headed "Student Corner" appears in each issue of the state bulletin, and students have been made responsible for collecting their own news notes.

To encourage student participation in the Association's program, a students' committee responsible for the development of student projects was appointed, and a competitive program among the students of the seven approved courses in the state was conducted. Students were allowed to choose their own problems, and each course director selected one project to be presented at the state convention held in Toledo in April. A committee of five judges who were in no way affiliated with the student courses was selected to rate the reports. Prizes of the first year's membership fee to the American Dietetic Association were awarded to the two students presenting the most valuable problems. The reports were rated on the following points: presentation, value of the project, thoroughness with which the project was conducted, and accuracy.

At the convention a two-hour session was devoted to the presentation of the student projects, with each student being allowed from eight to 10 minutes for her report. The Ohio Dietetic Association paid the expenses of the seven students at the convention, including transportation, hotel accommodations, meals, and registration fee. The average expense account per student was $15.50.

Each student made an excellent presentation, and nearly all used some type of illustrative material to clarify their reports. One study—a survey of food service in two children's homes made by Marilyn Nelson—appears in Current Comment beginning on page 1006 of this issue of the JOURNAL. It was felt that much was gained not only by the student dietitians, but by all dietitians attending the convention. Students had the opportunity to become acquainted with dietitians in the state and to observe what was being done in other hospitals. The Association feels that the first step has been accomplished in stimulating student interest in state association activities.—*Magdalin Klobe, St. Luke's Hospital, Cleveland, Ohio*

DIETETIC TRAINING IN THE NETHERLANDS

In Holland, there are two courses of training for dietitians—one in Amsterdam and one in The Hague.

The first course was established in September, 1935, in Amsterdam under the leadership of Martine Wittop Koning, a well-known domestic science teacher and pioneer in this field. This course functioned until 1944 when war conditions forced it to close. However, it was reopened in September of this year.

Entrance requirement for this course is graduation from a domestic science school, where the basic knowledge needed for dietitians may be obtained. The domestic science training, which requires three to four years after passing the high school examination, called H.B.S., Lyceum, Gymnasium or the final examination of the three-year course at a Mulo school, includes the following curriculum: nutrition; theoretical and practical cookery; elementary biology, physiology, physics, and chemistry; knowledge of wares; and psychology. Students usually graduate at 21 or 22 years of age, after which they may take dietetic training, a course planned so that students receive adequate training in the following subjects:

(a) Instruction in normal nutrition and dietetics;

(b) Preparation of diets and an understanding of the tasks of a dietitian;

(c) Lessons in calculating diets and in cooking them;

(d) Administration and home economics in hospitals and other institutions.

Only one day a week has been found sufficient to follow this course, which lasts one year, thus enabling persons already working or who are older than most students, to take this training and qualify as dietitians.

Since the start of this training at Amsterdam, the profession has widened its field of activity, and public health services, the Bureau of Enlightenment of Food Matters, as well as many hospitals are calling

for dietitians. It was, therefore, felt that although this diploma course in the past had met the needs of dietitians, a higher standard of training should be established. It appeared that the practical side of the training had been neglected, and time has proved that the basic scientific training should be combined with the essential practical work.

In September, 1943, a second training college at the well-known domestic science school, Laan van Meerdervoort, at The Hague, was started, with the following curriculum leading to a diploma:

(a) Instruction in normal nutrition;
(b) Instruction by specialists in dietetics and diseases of children and adults requiring special diets;
(c) Preparation of diets and instruction in the tasks of the dietitian, given by a practicing dietitian;
(d) Lessons in calculating and in cooking diets, given by a qualified domestic science teacher;
(e) Instruction by specialists in anatomy, physiology, infant feeding, social and child hygiene, and social services;
(f) Large scale catering and administration;
(g) Some instruction in public health, given by a doctor or a nurse.

In contrast to the training given at Amsterdam, students at The Hague have full-time training every day for a year. Each morning they do practical work in hospitals and in the afternoon attend classes at the domestic science school.

A uniform standard of training has now been established, with both the course in Amsterdam and that in The Hague following the same scheme and issuing diplomas. The only difference is that the training college in Amsterdam, given at the University Hospital (Wilhelmina Hospital), requires attendance for only one and a half days a week, so it is available to those already working.

The future will show whether the present training in dietetics is sufficient. There is already a trend toward opening a university degree course in dietetics.—*Diana J. Ten Haaf, president, Dutch Dietetic Association.*

AMERICAN DIABETES ASSOCIATION CONVENTION

The sixth annual session of the American Diabetes Association was held September 16–18 at Toronto, Canada, to celebrate, together with the University of Toronto, the 25th anniversary of the discovery of insulin. More than 1000 physicians from Canada and the United States, joined by illustrious guests from abroad (Dr. R. D. Lawrence of Great Britain, Dr. B. A. Houssay of Argentina, and Dr. H. C. Hagedorn of Denmark) paid tribute to the genius of the late Sir Frederic Banting and of his co-worker, Dr. Charles H. Best.

It was in a small attic laboratory in the Medical Building of the University of Toronto where a quarter of a century ago these two men performed their memorable experiments which ultimately fulfilled the hope and prolonged the life and health of innumerable diabetic patients all over the world.

Many of the papers presented were devoted to the revolutionary change which occurred in the treatment of diabetes due to the introduction of insulin. Diabetic coma, which in the pre-insulin era appeared to be the inevitable end of the disease, has become an avoidable complication, preventable and accessible to treatment. The life expectancy of the juvenile diabetic—in 1920 less than one year—today is practically equal to the life span of a healthy individual; whereas a diabetic pregnancy was formerly a great hazard for the life of the mother and child, it has now become safe.

The credit for this change must justly be given to insulin. However, all of the speakers emphasized that for proper control of his disease the diabetic does need not only insulin, but also proper diet. True, the severe restrictions in starchy food (starvation diet)—so characteristic of the pre-insulin era—have become unnecessary, but an adequate dietary regime remains a prerequisite for the control of diabetes with insulin. Fixed caloric intake and meals at regular intervals are of utmost importance.

Insulin made diabetes treatable, but diabetes is not yet curable. The years since the introduction of insulin have shown a steady increase in the incidence of sclerotic vascular diseases among diabetics, going hand in hand with the prolonged life span of diabetic patients, but occurring far earlier than in nondiabetic persons. The question was raised whether this vascular damage is a concomitant of diabetes arising from the same cause rather than a diabetic complication. It will be the task of the future to find not only a way to cure diabetes and its complications, but to prevent the disease entirely.—*Martin G. Goldner,* M.D. *assistant professor of medicine, University of Chicago Clinics.*

Enrichment of Bread Required by Law in New Jersey

On July 1, a new law became effective in New Jersey forcing bakers to enrich all bread. The measure provides minimum standards for various vitamins and minerals until the Department of Health can prescribe needed amounts. Should the Department find an existing or pending shortage of vitamins or minerals needed to comply with the law, however, it has the power to issue temporary suspensions.

Current Comment

THE DIETETIC INTERVIEW AS A TOOL IN CHANGING FOOD HABITS

DOROTHY HALL

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Behavior in relation to food often expresses fundamental character traits, hence in changing a person's eating habits one goes far beyond teaching dietetics; one changes the person's attitude toward himself and so changes his personality. Mealtime patterns frequently follow or even set the style of response which will appear in other life situations. For example, dietitians know that the person who makes mild chronic complaints about the color, temperature, or flavor of food served away from home (but still stows away a fair amount) may have similar methods of deflating other ideas and dampening other enthusiasms if they originate apart from himself.

Such patterns of behavior stem from the individual's earliest experiences. Satisfaction of oral needs—in other words, feeding—makes up most of the child's emotional life in the first few months. Breast feeding by a willing mother produces a contented, optimistic baby with good "waiting power" if feedings are delayed. Unless grossly mishandled, this baby has little need or wish to fret. Well regulated bottle feeding given in the mother's arms also produces a happy, hopeful baby. On the other hand, a mother who props her baby on a pillow during bottle feeding, who is too hurried or too disinterested to hold her baby, subjects the child to early frustrations, dissociates his early emotional satisfaction from the people to whom he must relate himself as controlling influences, and starts him off to feelings of insecurity.

Before scientists took much interest in the emotional life of infants, it was a known but little understood fact that babies in institutions did not thrive. Too much variety in handling, forced feedings, hurried and impatient feedings during this oral period lay the groundwork for lack of confidence in adults and a well-known pattern of defensive behavior.

The close relationship between food habits and personality are most obvious in children, but are not limited to childhood.

To illustrate this point further, a case may be cited in which the primary problem seemed to be psychiatric. An immature, dependent young mother had developed the physical symptoms of a lump in her throat and fear of being unable to breathe. Physical findings were reported negative by her private physician, although she insisted that she was "run down." Her husband was overseas, her baby was small, and she had returned to her position of youngest child in her mother's household. Her eating, when she was first interviewed, was on an infantile level. She showed no interest in food unless coaxed by her mother. Instead of coming to the table for meals with the family, she took coffee and snacks in mid-morning and mid-afternoon and an egg in a little wine brought to her at bedtime by her mother. She felt that she could not go out of the house alone for fear she would have a choking spell. Crowds made her panicky, and for this reason she avoided stores, movies, and social groups and refused at any time to be away from her mother. She expressed many food dislikes, such as milk, cheese, cereals, and liver on the basis that she had never eaten such foods.

The first interview was held with the patient and her mother—a kindly, hovering woman at her "wit's end." The patient told her fears and tried to explain them as a reaction to the shock of having her husband sent overseas. An attempt was made to make her feel that the difficulty of her situation was recognized and the interviewer suggested that this situation was especially hard for her to face because never before had she found it necessary to assume any adult responsibilities. Both the patient and her mother realized that the patient was reacting as the "little girl" her mother and older siblings had encouraged her to be. Her eating habits were cited as an example. This young mother was offered psychiatric help in handling her emotional problems. However, since she seemed afraid to accept it, the suggestion was made that she try to change her attitudes and that a good place to start would be with her food habits. Both the patient and her mother accepted this, and the nutritionist, with some understanding of the patient's psychiatric needs, took over the case.

A follow up of the case showed that a desirable personality change had taken place along with im-

provement in diet. She left the house alone; she shopped not only for herself but for her working sister. She had seen two movies, was doing some part-time work, and even had taken her vacation apart from her family. She was drinking milk once daily, or twice if she also had cocoa. She had tried liver and had taken on the responsibility of eating at meal time. She no longer waited for her mother to follow her around the house and coax her.

In this treatment there were about six interviews. In these, the dietetic information given seems to have been a vehicle in the process of helping this young mother in her delayed "growing up." The mother relationship with a nutritionist who had confidence that she could succeed, reassured her and helped her to go out in spite of the lump in her throat until it no longer terrified her. Her change in attitude made her think of herself as a person who *can*, rather than as a person who *can't*, with the result that she was not only "nourished," but she had developed a different personality. The nutrition interview was the tool which had accomplished this.

One of the most helpful discussions of the potentialities of the interview was given by Bertha Reynolds (1) a few years ago. She discussed the interview as having force or energy emanating from the two participants, stressing the two-way give and take. She focused attention upon the two movements within the interview—one, the business in hand, the other the movement of relationship between two persons. This relationship is conditioned by all of the past of both participants. Each comes to the meeting with ideas and purposes; whether these become a working plan depends on "feeling." The setting of the interview, the manner of greeting, facial expression, small talk or approach—are all instrumental in establishing a certain rapport or harmony of relationship. The building of a relationship needs to be a conscious process, but not stereotyped, and above all not artificial. The interviewer must have a deep seated interest in the patient as a person and vary the approach according to the patient's needs. One individual may wish to depend upon an authority; another may desire, though subconsciously, a parent substitute who will persuade, scold, and forgive; another may wish for an equal with whom he can argue; and still another may be unable to accept advice unless he can feel superior.

The undercurrent of feeling which plays between the two participants in an interview might be likened to a catalytic agent. Because of it the business in hand "takes or doesn't take," depending upon the strength of this less tangible factor. One either teaches only facts about food or goes beyond this to help an individual make a new adjustment to food.

In handling this factor consciously, one needs first to be convinced of its importance and the responsibility it entails. It may be compared loosely to the transference in psychiatric treatment—a positive attachment which may for a time make the patient too dependent upon the nutritionist, but if handled well leaves him with enough satisfaction in his own accomplishment to carry on by himself.

In dealing with nutritional problems, the interviewer has the security of good professional training. In establishing the relationship the interviewer may call on all that has gone into the building of his own personality and may also use the knowledge of sciences which deal with behavior.

There are a few simple guides, such as the laws of learning, which may be of help. First, patients should be *ready* for the help that is offered. If they are not ready, the material should be adjusted to their present thinking and habits. Second, material should be repeated without monotony. It may be given verbally, then reinforced in writing and by poster and general education. Third, it should bring satisfaction. It is in this third point that the relationship between the patient and the nutritionist plays its part. The nutritionist must reinforce known desires with other desires and strengthen the influence of one motive by appealing to other motives The more successfully she establishes a feeling of confidence on the part of the patient, the more desirable will appear the goals she stresses (2).

Some of the common appeals used are interests, ambitions, pride, ideals, weaknesses, desires, tastes, esthetic sense, sentiment, sense of humor, sense of fairness, appeal to prejudices, and appeal to loyalties. If a little time can be set aside to let the patient lead the interview by telling his reactions to his problem, his biases, prejudices, and interests and to give a picture to the interviewer of his cultural background as to racial, community, and family customs, the nutritional plan can often be speeded rather than delayed. It is well to keep in mind that, although technique or style of performance needs to be perfected, it is effective only as it reflects sincere interest in the person concerned.

In giving suggestions to people as to their way of living, the approaches of two psychiatrists illustrate the attitudes which may be engendered in such work. Mothers came away from interviews with one psychiatrist saying, "He tells me I should do thus and so," while mothers who saw the other came into the outer office with some such comment as "I've decided that I should do thus and so." In the first interview, the business in hand had gone forward, and the mother had listened and probably understood. In the second, both the business in hand and the more subtle process of motivation had been achieved and the mother had a new point of view.

Food habits and personality are so much a part of each other that it is not enough to teach principles of dietetics. It is necessary to treat attitudes—to

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NUTRITIONAL OBSERVATIONS IN PEDIATRIC PRACTICE[1]

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Nutritionists have made outstanding contributions to medical science. The work of Cannon, Lusk, McCollum, Sherman, Benedict, and many others has contributed much to our fundamental knowledge and has made possible many of the advances in preventive and clinical medicine.

During recent years the realization that many rejections from military service in both wars were directly or indirectly caused by inadequate or faulty nutrition has accelerated interest in nutritional science. The future emphasis in the practice of medicine appears to lie to a great extent in the field of nutrition. The physician will need to consider the patient's diet as carefully as he does the selection of a drug for the treatment of disease. He will realize that it is necessary to meet the nutritional requirements of each patient in all respects, and to make adequate recommendations accordingly.

Physicians have too often limited the dietary history of a patient to an inquiry regarding the appetite and the use of tea, coffee, and alcohol. Pediatricians are particular about the diets of infants but often fail to take detailed histories concerning the patients' diets beyond infancy. Inquiries concerning the mother's diet during pregnancy when the child's building stones are in formation are not often adequate. Burke (1, 2) and others have shown that as the mother is fed so is the child formed. The incidence of minor and major illnesses in babies born to mothers on poor diets is quite marked.

Holt and McIntosh (3) state: "Nutrition in its broadest sense is the most important branch of pediatrics. A knowledge of its fundamental principles is essential to the physician if he is to apply preventive and corrective measures intelligently." It is not only important to pediatrics but to all branches of preventive and clinical medicine. Since the chemical processes of the animal organism are dependent on the sun, air, water, and food, it is conceivable that a chemical disturbance may result when these are quantitatively or qualitatively deficient. When the balance is disturbed, functional conditions may develop which, if uncorrected, may develop into irreversible processes. Present knowledge makes it often impossible to detect minor changes in the organism which may presage future pathological conditions.

Bacteriologists have spent time and labor searching for illusive microorganisms, or identifying mysterious microorganisms with certain diseases which are also mysterious. In the past some of our well-known vitamin deficiency diseases were thought to be caused by infectious organisms, and not infrequently certain microorganisms could be found in the course of the disease. One of the best examples of this search is pellagra. The Thompson McFadden Commission in 1912 identified pellagra as an infectious disease. Later Goldberger proved that pellagra was a dietary deficiency disease and we recognize it as such today.

Our chemists have been searching for illusive toxins in many diseases, particularly in the toxemia of pregnancy, whereas nutritionists have been stressing the role of deficiencies in the diet as the cause of this toxic condition. McIlroy (4), a British obstetrician, states: "More progress has been made in the prevention and treatment of toxemia since we ceased to hunt for illusive toxins and began to recognize that many of the complications of pregnancy are due to some deficiency in nutrition or to some pre-pregnancy disease. Prevention is the keynote of the future in obstetrics as in all branches of medical practice. From clinical experience the author is firmly convinced that the way of research and progress lies, not so much in a more or less lengthy search for illusive toxins, as in an investigation of toxemia as a deficiency disease." Such admonitions are necessary to change some of our preconceived ideas.

Since the discovery of the vitamins, many have had a tendency to believe that this or that disease can be prevented or benefited by employing one or all of the vitamins as supplements to the diet. We do not realize that often they may do no good and may do harm. Evidence has been accumulating to prove that an imbalance of vitamins may disturb the physiological functions of the body. There are definite indications for the use of vitamins in the prevention and treatment of disease, but it must be realized that there are requirements for other food elements as well.

Nutritionsts have recently emphasized the importance of protein and the amino acids in health and disease. Research along this line has made it possible for the physician and surgeon to treat diseases more effectively and significantly to decrease mortality. The value of blood proteins as plasma in the treatment of shock and burns, the importance of

[1] Presented at the annual meeting of the New York State Dietetic Association, May 13, 1946, at Syracuse.

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amino acids in similar conditions and in peptic ulcer, and the use of B-complex vitamins in cirrhosis of the liver are examples of the nutritionists' contributions to medical science.

Elements beginning to be more closely scrutinized under the newer methods of investigation include sulfur and iodine. It is significant that recent important use in medicine has been made of the element sulfur in the form of the sulfonamides. Thiouracil is another new sulfur compound of importance to the physician. Sulfur and iodine, as well as some of the vitamins, are concerned with tissue respiration.

When we speak of tissue we refer to protein. When we think of nutrition we must consider protein first and then give careful thought to the effect the other food substances will have on it and its effect on them. When disease appears and the kidneys, stomach, heart, or other structures of the body are involved, it is the protein of the organism or the effect of a chemical or infectious agent on the protein that produces the pathological condition.

Protein not only supplies nitrogen for growth and repair of body tissues, it also has many other functions. Two of the amino acids, methionine and cystine, supply sulfur to the body which is necessary for tissue respiration, detoxication, and other purposes. In addition methionine furnishes a methyl group which is used by man in the synthesis of choline and creatine. Both methionine and choline have lipotrophic functions.

It is well known that protein is capable of supplying the body with energy. In addition protein acts as a colloid in the maintenance of osmotic equilibrium; it plays a role in the maintenance of acid-base balance; and it stimulates metabolism.

In recent years much evidence has accumulated indicating the importance of protein metabolism in relation to processes of natural and acquired immunity. Mills and Cottington (5) found that the efficiency of phagocytosis is definitely linked to the protein intake.

It has been estimated that there are 1600 different proteins in the body. These consist of amino acids which are arranged differently in the various proteins. At the present time, the structure of over 20 amino acids is known. The body appears to be incapable of synthesis of about 10 of these substances, and hence, of necessity they must be obtained from the proteins of the food. Each tissue, each secretion, and each hormone requires a different protein, a particular protein which must have different amino acids in different combinations. When the protein needs of the body are not met by the diet, the body draws upon the tissues to make up for the deficiency in intake. The protein reserves of the body are not only disturbed under such conditions but the sulfur and iodine in the tissues are excreted in abnormal amounts thereby creating additional deficiencies. The thyroid gland is thus unable to function properly, and the pituitary gland is also disturbed. The liver often shows degenerative changes. There is evidence that relative vitamin deficiencies result under such conditions even though adequate quantities of the vitamins are included in the diet or are supplied in supplementary amounts.

The quality of protein in the diet is of importance. It is possible to obtain an adequate intake of protein as vegetable protein, but a greater variety and larger amounts are usually required than when animal proteins are employed. Vegetables are unpalatable to many people, and for this reason enough protein may not be consumed in vegetable form for the individual's needs. Animal proteins, the so-called first class proteins, are more complete and richer in essential amino acids than most of the other proteins. They have high biological value. During depressions animal protein is plentiful but unobtainable by all people because of their limited purchasing power. In time of war, animal protein is not only expensive but scarce; rich and poor have the same difficulty in obtaining it. This scarcity and high cost obligate the individual, family, and institution to curtail the use of animal products in the diet and to subsist on cheaper and more readily procurable foods.

One would, therefore, expect to find deficiencies due to limited protein intake in a great proportion of our population under such circumstances, although such a condition may not be commonly recognized. If laboratory examinations alone are relied upon instead of a dietary history in making a diagnosis, then many cases of initial protein deficiency are missed.

During the war the author was puzzled by many patients' complaints. The drugs and vitamin preparations indicated gave disappointing results in many cases. It was not until a woman (6) developed pellagra who was on a diet which appeared to be adequate in all respects except protein, and who took supplementary vitamins regularly, that it was realized that the dietary protein of other patients was also in adequate. A protein hydrolysate preparation was prescribed for this patient and for others who failed to respond to supplementary vitamin preparations and other therapeutic measures. The protein hydrolysate was not entirely successful, however; a toxic factor appeared to be present, perhaps produced by the breakdown of body proteins. On the assumption that the liver is a detoxicating organ and that the livers of these patients had been affected by the protein deficiency, supplementary liver was also prescribed. This combination gave definite beneficial effects.

There may have been failure to utilize some of the ingested nutrients, including protein, because of damage produced by protein deficiency on the digestive organs and glands, or to an unfavorable

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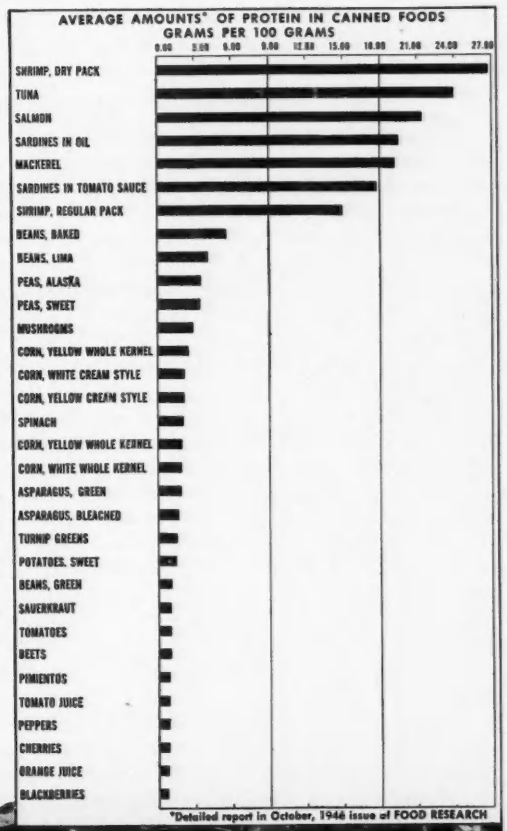

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modification of the digestive processes. A vicious circle probably resulted which further prevented the proper utilization of the restricted food supply. The protein hydrolysate required no digestive preparation and was readily absorbed. An important factor in its use was, no doubt, the restoration of the tissues concerned in the digestion and assimilation of food so that the other food substances could be better utilized.

COMMENT

These patients had many symptoms in common. As stated, one patient developed symptoms and signs on which a diagnosis of pellagra could be made. Other patients had symmetrical lesions on the hands and feet which may or may not have been manifestations of pellagra. Most, if not all of these cases, appeared to be due primarily to protein deficiency. That there were other deficiencies is assumed; however, they were apparently little affected by treatment until the protein deficiency was corrected.

In 11 patients on whom Goldberger and Tanner (7) originally reported, recurrences of pellagra were noted on a diet that was adequate in minerals and all the known vitamins but low in protein. "It emphasized," they stated, "that the mere inclusion of a food believed to have preventive value is not itself all sufficient; that a quantitative factor must be taken into account." They considered amino acid deficiency as the primary etiological factor in pellagra and stated regarding the vitamins, "A vitamin or vitamins may play an important role by minimizing or accentuating the effects of the protein fault."

It was not until somewhat later that Goldberger declared the lack of the pellagra-preventive vitamin, which we know as niacin, as the cause of pellagra. In recent years, it has been pointed out that this vitamin will correct some, but not all of the symptoms of pellagra. It has been noted also that when niacin is given in the treatment of this disease, riboflavin and thiamin deficiencies develop. There has been a trend to reinvestigate the original toxic corn theory presented by Casal in 1735. Handler (8), and Krehl (9) have recently found that corn on a dry weight basis contains as much niacin as eggs, milk, polished rice, oats, or rye and often more, yet animals develop black tongue on corn more readily than they do on other foods containing much less niacin. Goldberger, in his original communications, felt that pellagra was caused by a deficiency of amino acids. The author's observations tend to indicate that protein deficiency with a relative vitamin deficiency together with a toxemia are factors in pellagra.

SUMMARY

Physicians have more or less disregarded the dietary histories. In the future, they can ill afford to be lax in this respect, since the future emphasis in the practice of medicine appears to lie to a great extent in the field of nutrition.

Physicians have tended to search for the source of disease in the laboratory instead of in the diets of their patients. Most of the vitamin deficiency diseases were at one time considered to be caused by infectious agents, and many vague diseases may eventually prove to be dietary deficiency diseases.

The protein of the body has been more or less taken for granted, whereas, it should be regarded, as its Greek root implies, of first importance. Chemical processes within the body are impossible because without protein there is no body. When protein is deficient in the diet, certain physiological functions are disturbed and relative deficiencies of sulfur, iodine, and vitamins result. Protein deficiency is more frequent in our population than is commonly supposed.

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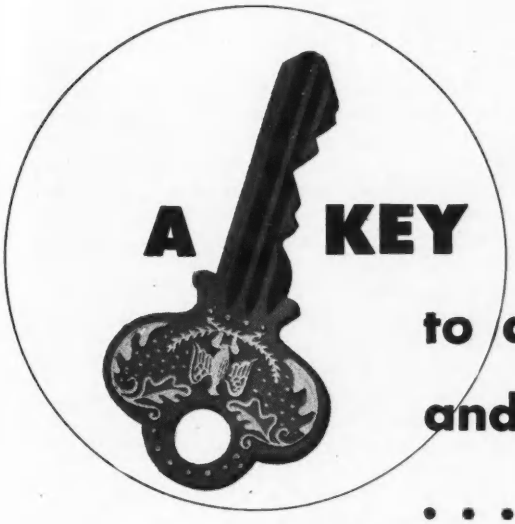
OBSERVATIONS OF DIETARY INTAKE IN TWO CHILDREN'S HOMES

MARILYN NELSON[1]

Satisfactory feeding in childhood has long been recognized as an important factor in achieving optimal health and well-being. Dr. McHenry's statement that "the state of nutrition of a particular person cannot be better than the food he consumes" is becoming more widely recognized. Colleges,

[1] Presented at the annual meeting of the Ohio Dietetic Association. Miss Nelson, a student dietitian at University Hospital, Columbus, in competition with five other students won first award for this paper.



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universities, and scientific societies, together with community health depatments, are undertaking studies to determine the nutritional status of specific groups within the community.

The study described in this paper was conducted to obtain an evaluation of the diets of institutionalized children and to make available to the administration of the institutions any suggestions and recommendations necessary for the improvement of the menus.

A request was made by the supervisor of a religious institution, which shall be referred to as Institution A, that the study be made and a list of menus was submitted. Subsequent observations covering a three-day period were then made at this institution and methods of food preparation, service, and actual food consumption were noted. The physician at a county home, which shall be referred to as Institution B, permitted a similar study. No menus were submitted, but observations similar to those in Institution A were made for a five-day period.

There were approximately 160 children in each home, with an almost equal division between the number of girls and boys. The range in age was six to 16 years in Institution A, and two to 21 years in Institution B.

The natural home-like atmosphere which had been fostered at Institution A was evidenced by the attitudes of the children at their meals. They ate in family groups, two children acting as a host and hostess at each table and serving the remainder of the group. There was no regimentation, so characteristic of institutional life, and the children laughed and talked naturally at meals.

At Institution B the opposite was noted. There was marked regimentation; the children marched into the dining room single file, boys on one side, girls on the other. The boys sat on one side of the room and girls on the other; each row of tables was served and supervised by an adult. A minimum of talking was allowed, and any unnecessary talking or slight laughter was promptly reprimanded. Although the children at both institutions ate all that was served to them, it was evident that children in Institution A ate their meals with relish, while those at Institution B merely ate their meals.

The breakfast in Institution A consisted of a cooked cereal, fresh or canned fruit in season, bread, margarine, and cocoa. At Institution B children received a dry cereal, bread, butter-margarine mix, and milk. No fruit of any kind was served in the morning.

The children at Institution A were served some type of meat daily (liver once a week, muscle meats two or three times, and frankfurters or luncheon meat the remaining days). One cooked vegetable in addition to potatoes was served daily, and leafy green or yellow vegetable two to three times weekly. Bread and margarine and some type of dessert, frequently pie, and water completed the luncheon menu. The noon meal at Institution B consisted of a soup; macaroni, spaghetti, or potatoes; some other cooked vegetable; bread; butter-margarine mix; and milk. Raw or leafy green vegetables were served only occasionally.

For supper, the children in Institution A received a meat substitute such as macaroni and cheese, cream soup, or chile; occasionally a vegetable; a fruit dessert; bread, margarine, and milk. Institution B served a meat, usually a luncheon meat, frankfurters, or sausage; a cooked vegetable or fruit; bread; butter-margarine mix; cookies or doughnuts; and milk.

In Figure 1 the diets of each institution have been analyzed *qualitatively* from the standpoint of the seven essentials. Institution A is indicated in solid black; Institution B in the dotted section. Children in Institution A received only 50 per cent of the recommended milk allowance or 2 cups daily; those of Institution B received 100 per cent or 1 qt. Both groups received less meat, cheese, and fish than is

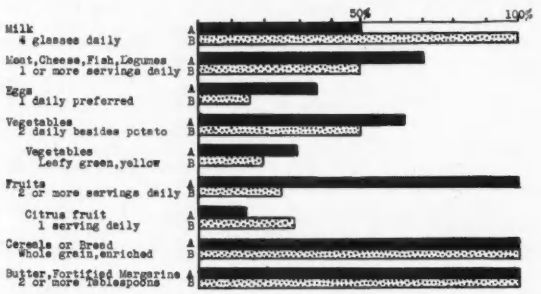

FIG. 1. *Evaluation of the diets of two children's institutions, based on the seven essentials*

customarily recommended; Institution A received 70 per cent of the recommended one serving daily, and Institution B 50 per cent. Frankfurters and luncheon meat were counted as half servings. The children in Institution A consumed about two eggs a week. In Institution B the children received only one egg a week. In Institution A the diet contained less than two vegetables daily besides potatoes. These children received only two servings of raw, leafy green, or yellow vegetables weekly instead of one daily. A similar condition can be noted in Institution B, where the vegetable intake was only one half of that recommended, and the raw, leafy green, or yellow vegetable intake was only 20 per cent, or about one and a half servings a week. Two servings of fruit were consumed daily in Institution A; while only two or three servings per week were consumed by the children in Institution B instead of the recommended two servings daily. One portion of citrus fruit was served weekly in Institution A, and one to two in Institution B. The children in each group received enriched or

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whole grain breads and cereals and butter or fortified margarine. In Institution A margarine was used constantly; and in Institution B a butter-margarine mix of 3 lb. of butter to 9 lb. of margarine was used.

For a *quantitative* comparison of food intake, an average 10-year-old child was observed in each group. The results of this quantitative estimate as compared with the recommended allowances of the National Research Council are presented in Figure 2. Both diets were found to be slightly low in caloric value. Of the recommended 2500 calories, the child in Institution A received 87 per cent or 2200 calories, and the child in Institution B received 80 per cent or 2100. The child in Institution A received only 56 gm. of protein which was 81 per cent of the daily

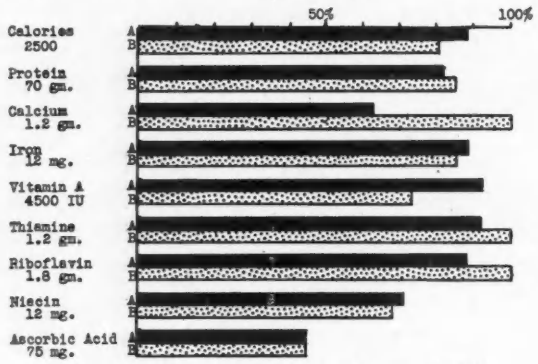

FIG. 2. *Evaluation of the diet of a 10-year-old child in two institutions*

protein requirement of 70 gm.; whereas the child in Institution B received 60 gm. or 85 per cent. This difference can be explained by referring to Figure 1 where we see that although the child in Institution A had 30 per cent more meat, the child in Institution B received 50 per cent more milk, and on the average consumed two to three more slices of bread. The child in Institution A received only .76 gm. calcium daily, a fact easily explained by his consumption of only two cups of milk per day. The child in Institution B received a full quart of milk daily and had a calcium intake of 1.3 gm. Both diets are low in their iron content. The diet in Institution A contained 10.6 mg. or 88 per cent of the 12.0 mg. in the recommended allowance, and the diet in Institution B contained 10.0 mg. or 83 per cent. This may be explained by the small quantities of meat and eggs consumed.

The vitamin A content of the diet in Institution A was 93 per cent of the recommended 4500 I.U. daily; this was met chiefly by the inclusion of some vegetables in the diet and large quantities of fortified margarine. The child in Institution B received 75 per cent of the daily recommended allowance or 3300 I.U. The chief sources of vitamin A were milk, butter, and margarine, almost no vitamin A being contributed by vegetables. The thiamin intake of the child in Institution A was 92 per cent of the recommended 1.2 mg., or 1.1 mg. daily. That of the child in Institution B was 110 per cent or 1.3 mg., due to the large amount of bread consumed. Riboflavin was 88 per cent of the recommended allowances for the child in Institution A. He received 1.6 mg. daily as compared to the recommended 1.8 mg. The inclusion of more milk in the diet would easily raise this above the recommended figure. It is the large amount of milk and enriched bread in the diet of the child in Institution B that gave him an intake of 2.3 mg. of riboflavin daily, 130 per cent of the recommended amount. Both diets were low in niacin. The child in Institution A received 8.7 mg. or 73 per cent of the desired 12.0 mg. standard, while the child in Institution B received 8.4 mg. or 70 per cent of that standard. Both diets were below the recommended allowance for ascorbic acid; each child received an average of 35 mg. per day or 46 per cent of the recommended 75 mg. The child in Institution A received most of his ascorbic acid from fruits and vegetables, even though the diet was low in citrus fruit; the child from Institution B received more from milk and potatoes. The amounts contained in the potatoes and other cooked vegetables was appreciably decreased in both institutions by the cooking methods, in which large amounts of water were used and the vegetables were cooked for long periods of time, in some cases for as long as two hours.

Using the figures obtained on both the qualitative and quantitative basis, it was recommended that the diets at both institutions be improved, and the following general recommendations were made to each group:

(a) An increase in milk to 1 qt. per child per day was recommended for the children in Institution A, to insure an increase in the calcium and riboflavin intake, as well as vitamin A, thiamin, and ascorbic acid, and to provide a good quality and quantity protein.

(b) An allowance of one egg or equivalent per child per day was suggested at both institutions to improve the protein intake as well as the intake of vitamins and minerals.

(c) Three to 4 oz. of meat daily was recommended in order to increase the protein, iron, and niacin of the diet in both Institution A and B. The use of liver once a week was also recommended.

(d) A leafy green or yellow vegetable daily, or a raw vegetable such as carrot or turnip sticks, celery, or cabbage was suggested. In both institutions it was recommended that the vegetables be cooked in small amounts of water for shorter periods of time to preserve the nutritive value.

(e) One serving daily of citrus fruit or tomatoes was recommended in both diets to insure a higher acid intake. Two servings of fruit were received at Institution A, but not at Institution B. A

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second serving of fruit daily was suggested for the children in Institution B.

Similar studies have been made in orphanages and children's homes throughout the country, and the results have been reported and published. It may be necessary, however, to do a study of this type in each community if people are to be made fully aware of the existing conditions. It is hoped that this study and the recommendations coming from it will serve as a starting point in the improvement of dietary standards in these institutions, and that the children may receive the benefits to be derived from an adequate diet during childhood and adolescence.

ENRICHED WHITE RICE

New hope for the conquest of beriberi, the vitamin-deficiency disease that plagues the rice-eating millions of the Orient, is provided by the development of a process for enriching white rice with synthetic vitamins and minerals, according to a report in *Industrial and Engineering Chemistry* by Dr. Max F. Furter, Dr. William M. Lauter, Elmer De Ritter, and Dr. Saul H. Subin of Hoffman-LaRoche, Inc., Nutley, New Jersey.

The report explains that beriberi, which is characterized by multiple neuritis and general debility, is caused by an inadequate supply of thiamin, the antineuritic vitamin. Although the original brown rice contains thiamin, 80 per cent of the vitamin is removed in the milling of natural rice to obtain the white polished product preferred by most rice-eaters. Beriberi is found principally in regions such as China, Japan, India, and the Philippines where people live on diets containing large amounts of polished rice.

While the loss of thiamin is the outstanding deficiency incurred in the milling of rice, other nutrients suffer a similar fate. As a consequence of the low content of certain factors, such as riboflavin in the original brown rice, and of high milling losses for others, white rice is a poor source of these nutrients. Undermilling and parboiling have previously been tried as methods for improving the nutritional quality of white rice. However, undermilling was difficult to regulate at an effective level, parboiling required costly equipment, and the resultant products were not popular because they differed in appearance and flavor from the accepted white rice.

The so-called Roche process for enrichment described in the report is said to be relatively inexpensive. It entails preparation of a fortified premix on a rice basis and dilution of the premix with ordinary white rice by simple mixing, in the ration of one premix kernel to 200 ordinary kernels, so that the presence of the premix will not be noticed by the eater. The premix consists of white rice coated with solutions containing synthetic thiamin, synthetic niacin—the pellagra-preventive factor in the B-complex—and iron. Riboflavin, a growth-promoting factor, is excluded because of its yellow color.

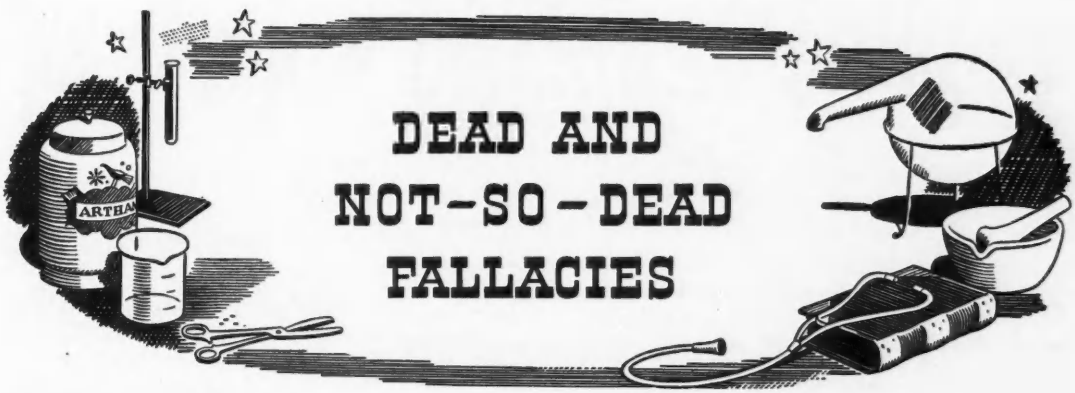
The washing of white rice, a universal custom, removes a large part of whatever natural vitamin and iron content remains after milling. Therefore, the natural nutrients are ignored in fixing enrichment levels, which are high enough to satisfy the minimum flour enrichments of the U. S. Food and Drug Administration even after the usual household washing and cooking of the rice.

Nutrient losses caused by cooking, however, can vary considerably depending on the cooking method or recipe used.

Methods involving cooking with a large excess of water, followed by discharge of the cooking water, or methods involving steaming with subsequent discard of the condensed water, lead to high losses regardless of the kind of rice used. Unnecessarily long cooking also causes increased losses of vitamins. From a nutritional viewpoint, the most sensible method of cooking rice is to add just sufficient water to produce a palatable but not too soft rice by the time the cooking water is all absorbed. The use of a double boiler is desirable to avoid high temperatures at the bottom surface of the pot which tend to accelerate vitamin losses. However, if a reasonable cooking time is allowed, vitamin losses are not excessive even with direct heating.

Extensive tests of the stability of the enriched rice during storage have been made. Both premixes and enriched rice having been kept in paper, burlap, tin, wood, and glass containers for periods up to 12 months under various climatic conditions up to 40° C., including high humidity. The premixes did not deteriorate physically and the addition of premix to white rice did not affect the keeping properties of the white rice. The investigators also found that the premix was uniformly distributed among the white rice even after packing and shipment by truck or rail.

Experiments with rats fed on the premix have shown that large amounts can be eaten without ill effect, and further studies with rats have established that the thiamin in the raw premix is readily available for growth. Moreover, it has been found in tests with human beings that the protective coating on the premix kernels does not interfere with the physiological availability of the vitamins in the enriched rice even when the components of the coating are present in amounts 20 times greater than usual.



For several generations, persons with burns thought that they were getting effective treatment if they held the injured part before a fire. This was supposed "to draw out the inflammation."

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Book Reviews

Annual Review of Biochemistry. Vol. XV. Edited by J. Murray Luck. Stanford University, Calif.: Annual Reviews, Inc., 1946. Cloth. Pp. 687. Price $5.

To workers and students of nutritional research and dietetics, the new volume will be indispensable. The section on "Nutrition" regrettably could not be prepared in time for publication. However, it is announced in the Preface that Professor E. W. McHenry has been allotted additional space in the next volume so that a two-year period may be adequately covered.

While the subject of nutrition, as such, has not been reviewed, the chapters on vitamins, carbohydrates, proteins, and fats will be of direct interest to workers in the field of nutrition. The development of new techniques, including the use of isotopes, the microbiological assay of amino acids, and the use of sulfa drugs to study the metabolism of intestinal bacteria have resulted in many new characterizations of nutrients.

The increasing importance of isotopes as a tool in biochemistry is reflected in the notable advances which have been made in intermediary carbohydrate and protein metabolism with this technique. Cori and Cori have pointed out that isotopes have been used to great advantage in demonstrating reversibility of enzymatic reactions. The gap which often exists between results obtained in experiments on the whole animal and on isolated enzyme systems is being bridged, with isotopes playing a leading role. A unified picture, however, will not emerge until the mechanism of the regulatory effect of hormones on enzyme systems is more clearly understood. In protein chemistry, the isotope technique has shown that the cellular proteins are in a state of flux, being rapidly degraded and resynthesized.

Dutcher and Guerrant note in their chapter on "Vitamins" that over 1000 papers relating to different phases of vitamin research were published in 1945. Physiological research has been characterized by additional emphasis on vitamin metabolites, studies on the physiological properties of structural analogues, antivitamins, vitamin-enzyme relationships, and on the biosynthesis of members of the B-complex. A chemical method for the conversion of B carotene to vitamin A has been announced. The synthesis and clinical use of folic acid has been reported. The authors cover not only the chemical and the physiological aspects of vitamins but also the nutritional aspects in human and animal nutrition, as well as sources of vitamins in natural and processed foods. Four hundred and forty-five references are cited.

The chapter by Leicester on "The Biochemistry of Teeth" holds much promise for the future. It is encouraging to note the process of integrating a very large quantity of previously apparently unrelated data. This chapter will be particularly interesting to nutritionists in the public health field, since the understanding of the biochemistry of the teeth is basic to any effective program for the care of the mouth structures.

Handbook of Food Preparation. Washington: American Home Economics Association, 1946. Paper. Pp. 47. Price 50c.

This booklet can unquestionably be a valuable addition to the personal library of anyone concerned with high standards and precision in food purchasing and food preparation.

The dietitian whose responsibility involves food purchasing will find occasion to refer frequently to the sections on: definitions and standards of identity of foods, quality and size grades of foods, tables of weights and measures, weight and volume measurements of food materials, purchasing guide for foods, and common can sizes.

Those concerned directly with food preparation will find practical use for the sections on: definitions of processes in food preparation, methods of measuring ingredients, construction of recipes, basic proportion, equivalent substitutions, thickening and jellying agents, foam stability, hydrogen ion concentration and *pH* of some common foods, yield of home canned products from raw materials, cooking time and temperatures, altitude cookery, and solubility of sugars and salt.

The Terminology Committee of the Food and Nutrition Division of AHEA should be commended for completion of this tremendous task of collecting data and information.

Diabetes. By Lt. Col. Henry J. John, M.D. St. Louis: The C. V. Mosby Company, 1946. Cloth. Pp. 300. Price $3.25.

This new book is intended to utilize the current knowledge on diabetes for the "busy practitioner," who lacks experience in the practical application of the principles of diabetes.

In the Foreword, William S. Middleton, professor of medicine and dean of the Medical School, University of Wisconsin, attests to the effectiveness of Col. John's management of diabetic patients. Col. Middleton points out that his management differs from the conventional approach in two respects: "In the first place, unless some clinical emergency presents itself, all diabetic patients are placed on a regimen as closely approximating their normal existence as possible. Most important, the caloric level of the diet is set at maintenance from the onset. Second, the support of insulin is based upon blood sugar determinations, at frequent intervals, rather than glycosuria."

It is to be regretted that Col. John's intention of "utilizing the current knowledge" has not been attained in the description of dietetic therapy. In fact, no cognizance has been taken of the recommended dietary allowances for minerals and vitamins, of the newer simplified methods of dietary calculations, or of the trend toward "normal food selection."

In a large number of menus, calcium, phosphorus, and the vitamin B-complex are grossly below the recommended dietary allowances. In addition, vitamin A and carotene will be lowered in those menus where mineral oil salad dressing

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has been used. Curtis has calculated that each ounce of mineral oil will dissolve 140,000 I.U. of carotene at body temperature and 120,000 I.U. of carotene at room temperature. Furthermore, since it has been shown that the ingestion of liquid petrolatum or mineral oil is capable of interfering with the absorption of vitamin D, calcium, phosphorus, and vitamin K, it has been concluded by the Council of Foods and Nutrition of the American Medical Association that there can be no justification for the incorporation of mineral oil in foods.

In the dietary calculations, no recognition has been given to simplified methods of making dietary estimates. While mention is made of 5 or 10 per cent vegetables, no use has been made of this information; instead, figures on food composition have been carried out to the tenth of a gram—implying greater accuracy than is likely or even possible in most cases. The further simplifications which are possible have not even been suggested.

And lastly, the modern trend toward "normal food selection" has been ignored. In fact, excessive use of "special" diabetic foods is outlined in each menu plan. These foods are not only of dubious nutritional value, but are expensive, and place the diabetic in a category that is obviously "abnormal."

Manual for School and Institutional Lunchrooms. Rev. ed. Prepared and published by The Ohio Dietetic Association, 1946. Paper, spiral bound in plastic. Pp. 222. Price $2. Copies may be obtained by addressing correspondence to Room 1016, 1001 Huron Road, Cleveland 15, Ohio.

Because the sale of the first edition of this manual, titled *Manual for Managers of Rural and Other Small School Lunchrooms*, was not limited to rural lunchrooms, the revised edition carries a new title as well as revamped text material. Prepared by the Community Nutrition Section of the Ohio Dietetic Association, the new *Manual* is divided into two sections as was the first edition. The first part comprises a short instruction course in school lunch technique, while the second section contains menus, with quantities given for 12, 25, and 50 servings. New recipes have been added, the latest food facts have been incorporated, and the most recent school lunch projects discussed.

Food Used by Filipinos in Hawaii. By Carey D. Miller, Lucille Louis, and Kisako Yanazawa. Honolulu: University of Hawaii, Agricultural Station Bulletin 98, 1946. Paper. Pp. 80.

In this booklet, the authors have used an unusually effective and interesting method of presentation of information regarding a people's dietary. Not only are chemical analyses and vitamin assays given (22 food products were studied) but to accompany these statistical and scientific data there is a brief discussion of Filipino methods of food preparation with recipes using the foods analyzed and pictures of 17 of these foods. The technical section describing the preparation of the samples and methods of chemical analyses and vitamin assays takes up a minimum of space.

A special section is devoted to a study of the emigration of various dialect groups from the Philippines to Hawaii and their present distribution in the Territory. A map shows the regions from which they emigrated. Comparative data of great interest are included in the diets and health of Filipinos in the Philippines and in Hawaii.

According to the Foreword, the bulletin was written primarily for the use of teachers, extension agents, public health nurses, dietitians, and others interested in the welfare of Filipinos in Hawaii. The food and dietary habits of Filipinos whose incomes were low, rather than those in the educated, well-to-do group, were studied.

Home Economics. By Katheryne T. Kealey. Boston: Bellman Publishing Company, Inc., 1946. Paper. Pp. 24. Price 75¢.

This monograph is number 66 of a series of Vocational and Professional Monographs which deal with occupational opportunities in various fields. The author is head of the Home Economics Department, Nasson College, Springvale, Maine. Basically, the information on the occupational aspects of home economics careers is sound, although some of the salary figures and the opportunities listed are not up-to-date. However, this can be readily understood for new opportunities open up and the salary situation changes so rapidly that any information prepared for publishing may be dated before the material is off the press. The bibliography, too, does not include the more recent books and pamphlets available, the latest date of publication listed being 1941.

Palalability Factor "X"

An unidentified factor "*X*," possibly a vitamin, which plays an important role in the palatability of foods has been found by A. M. Hartman and C. A. Carey of the Department of Agriculture. These workers have found that palatability depends not only on taste, but also on the need of the body for a particular food.

Nutrient *X* is found in lettuce, egg yolk, beef and pork muscle, bluegrass, alfalfa and timothy hay, and liver extract. Cheese is a good source of *X*, but no nutrient *X* is found in butter fat. It is not present in whole wheat; white, enriched white, or wheat flours; wheat bran; corn meal; soybean oil meal; linseed oil meal; heat-coagulated egg white; or yeast. The *X* in a cow's diet is supplied by the pasturage and hay, not from grain feeds. *X* is not present in purified lactose—milk sugar—and the researchers have shown in experiments that rats on diets including lactose made poorer growth than on diets which did not include lactose.

Other experiments have shown that rats on a diet relatively high in protein (65 per cent) usually die if *X* is lacking but live and grow at 85 per cent of the normal rate on the same diet to which *X* has been added and show a preference for food in which *X* is included. This is also true when small quantities of liver extract containing a high proportion of *X* are injected.

Although the factor has not yet been isolated, it has been shown that it is not destroyed by heat under several forms of processing, such as commercial drying of milk and casein.

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Current Literature

Contributed by Janet Engebretsen, Janette C. Carlsen, and Ethel M. Miller, Dietary Department, Johns Hopkins Hospital; Lorraine G. Weng, and Marian T. Straube, University of Chicago Clinics; and Marjorie M. McKinley, Women's Educational and Industrial Union, Boston.

THE AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 13, August, 1946

* Some effects of gum chewing on gastric acidity in healthy individuals. C. S. Smith, H. L. Wikoff, and M. E. Southard.—p. 245.
* Peptic ulcer. A roentgenological, laboratory, and clinical follow-up of 200 peptic ulcers. A. J. Delario.—p. 260.

Effects of Gum Chewing on Gastric Acidity. The rather wide-spread use of antacid candies and chewing gums for the treatment of self-diagnosed cases of hyperacidity (which actually may or may not exist) prompted this study of the effects of plain gum chewing on gastric acidity. The effect of gum chewing on gastric acidity has been studied in 12 individuals from whom normal gastric curves had previously been determined. The chewing of gum depressed the gastric acidity of two thirds of the subjects for an hour. Both the total and the free acidity were depressed in five sixths of the individuals for the first half hour. The maximum total acidity was less in 11 of the 12 subjects when gum was chewed. However, the time required to reach this maximum did not vary materially from the time required when no gum was chewed.

Peptic Ulcer. This report of 200 cases of peptic ulcer includes the incidence of ulcer in the U. S., England, France, Germany, Russia, Denmark, and Australia; the etiology of pain in peptic ulcer; the incidence of hemorrhage and surgical intervention; and methods of treatment. It would seem that peptic ulcer tendency is inherited and is in some way associated with the hyposthenic body type and a derangement of the autonomic system, with a tendency towards vagotonia. These tendencies make it possible for an ulcer to appear when the proper environmental factors present themselves. These factors include climatic changes, dietary indiscretions, and emotional factors. It must be stressed that peptic ulcers, especially gastric ulcers, may heal by medical treatment, and that once an ulcer has healed it usually remains healed. However, recurrent ulcers are usually the same ulcers which have become activated after a resting period. The author states that subtotal gastric resection is being popularized on the theory that few gastrojejunal ulcers occur after this operation possibly because of greater alkalinization. However, the number of patients who will die from the operation may more than account for the difference.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES

Vol. 212, August, 1946

* Melituria in healthy American men with special reference to transitory glycosuria. I. J. Wolman.—p. 159.
* Vitamin levels in pernicious anemia. D. Cayer, J. M. Ruffin, and W. A. Perlzweig.—p. 179.

Melituria. The examination of recruits for the Marine Service during the last few years provided an opportunity for extensive studies on normal men and women. Of 77,293 enrollees screened in one place, 324 showed positive Benedict's tests. Sugar in the urine may be due to a low renal threshold, diabetes mellitus, emotional or dietary upsets, or congenital abnormalities. All of these men had experienced emotional upsets in leaving their homes and families, and many of them had traveled long distances under crowded conditions with poor food. When the 324 were reexamined after a few days of rest and good diet, only 21 had diabetes. One conclusion was quite obvious: as the age group increased, there were more cases of melituria.

Vitamin Levels. Vitamin levels of pernicious anemia patients have been studied sketchily; this paper reports on eight anemic patients. Seven had the characteristic hemotologic picture plus glossitis, papillary atrophy of the tongue, and early neurologic changes. The anemic group was compared to a control group of 30 healthy medical students and to a group of 25 B-complex deficient patients. All groups were hospitalized and fed a standard diet of low vitamin content but adequate protein and calories. Studies during the test period and after showed no marked changes in vitamins A and C, nicotinic acid, riboflavin, and thiamin levels of the anemic group. Those of the deficient group were lower than the normal. This confirms the theory that the anemic patients always get along better when they have an ample B-complex intake.

AMERICAN JOURNAL OF PUBLIC HEALTH

Vol. 36, August, 1946

* Developments in the science of nutrition during world war II. C. G. King and O. Salthe.—p. 879.

Developments in the Science of Nutrition During World War II. Some of the striking developments in the field of nutrition arising during the war period are presented. These include the sharp awakening to the fact that only a few physicians have sufficient training to be recognized professionally as nutrition specialists; the advances in techniques for appraising nutritional status; improved convalescent treatment of men subjected to liver injury from infectious hepatitis; increased knowledge of folic acid rather clearly showing that deficiency of that factor makes the intestinal tract more subject to disease and that it is of value in treating both sprue and certain types of anemia. The importance of proper food in relation to optimal resistance to cold, to impaired night vision, to fatigue, and to excessive heat exposure has been demonstrated. Studies of nutrient losses during storage and preparation have demonstrated that large losses occur in members of the vitamin B group, notably thiamin and folic acid. In the European theater repeated appraisals of mass feeding programs have been characterized by emphasizing the importance of potatoes, cereals, and green or yellow vege-

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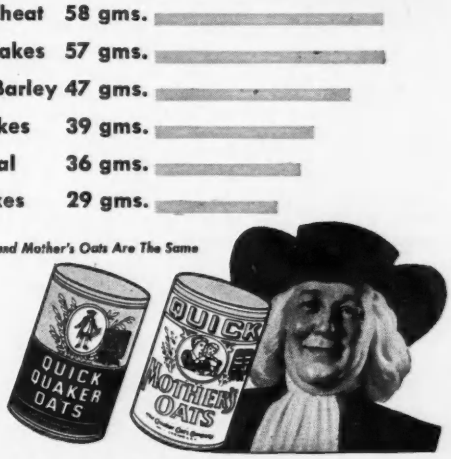

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tables. Another pattern of feeding was developed extensively in western Europe during the war, namely a special provision for vulnerable groups, to supplement the "iron ration" for civilians.

ANNALS OF INTERNAL MEDICINE

Vol. 25, August, 1946

* The nutritional status of Japanese prisoners of war, Burma, 1945. R. Kark.—p. 266.
* Beriberi in Japanese prison camp. R. E. Hibbs.—p. 270.

Nutritional Status of Prisoners of War. Twenty-nine Japanese prisoners of war captured in Burma offered an unusual opportunity to study the state of nutrition. For three weeks prior to the capture, most of them had subsisted on rice or rice and fish or sugar cane. Nine of the group had been treated previously for beriberi; at one time they stated that 80 per cent of one battalion had beriberi. About one fourth of the prisoners had lost weight, but only three were emaciated. Many of the patients had anemia; several had ankle edema; six had vitamin A deficiency as shown by eye lesions. Only three of the group had beriberi as demonstrated by ankle reflex. Serum protein and vitamin C levels and urinary vitamin C and thiamin excretions were below par. This low nutritional standard is a reflection of the poor medical care given the enemy; many will likely require treatment for anemia, hypoproteinemia, and ariboflavinosis.

Beriberi. For 34 months, observations were carried on under great difficulty on 8000 Americans who were prisoners at Bataan and Corregidor; the American doctors kept records and did all that was possible under the conditions of war. Beriberi had the highest incidence and morbidity of all of the vitamin deficiency diseases; it was chronic and was responsible for more deaths. Beriberi was a natural consequence of the very poor diet given the prisoners; rice or corn; vegetable leaves and small amounts of oil; fish; fruit; and carabao meat were the main items available. In addition to low thiamin content in the diet, the high carbohydrate of the diet utilized all of the available thiamin intake; either protein or fat require less thiamin for metabolism. Attacks of diarrhea, vomiting, and chills increased the need of thiamin; at one time, 75 per cent or 5000 to 6000 men suffered from painful neuritic feet. Except for the patient with severe cardiac complications, the other beriberi patients managed to live and improve if medications came or the diet improved. There was a scarcity of thiamin chloride and only 1 to 2 mg. per day could be given instead of 20 mg. Even when larger doses were given, the body was slow to respond for it takes several weeks to saturate human tissues.

ARCHIVES OF PEDIATRICS

Vol. 63, July, 1946

* Food poisoning as the etiological factor in poliomyelitis. R. R. Scobey.—p. 322.

Food Poisoning as Cause of Poliomyelitis. This paper suggests that poliomyelitis is caused by food poisoning (hydrocyanic acid) rather than by an infectious agent and presents some evidence which seems to substantiate this thesis. Poliomyelitis rarely occurs among those who are intimately associated with the disease during epidemics. Reported cases are often many miles apart with no opportunity for contact, which suggests that infection is not responsible. Conditions of hygiene and sanitation have been improved and still it has not been followed by a reduction in the prevalence of poliomyelitis.

Hydrocyanic acid is capable of producing symptoms and pathological lesions similar to those of poliomyelitis. It is present in many vegetables and fruits that are produced and consumed during the time poliomyelitis is prevalent. The content in plants varies according to geographical distribution, climatic conditions, and seasonal incidence—conditions which seem to correspond to epidemics of poliomyelitis.

Persons with high metabolic rates—children and pregnant women—are more susceptible to cyanide poisoning and the incidence of poliomyelitis is higher in children than in adults. Pregnancy also seems to increase the susceptibility to the disease. Hydrocyanic acid is volatilized at high temperatures, and it is possible that the practice of pasteurizing and boiling milk before it is offered to infants has resulted in the lowered incidence of the disease among infants in recent years.

When glucose accompanies hydrocyanic acid, its poisonous effects are minimized. The quality of protein in the diet is also important. From a practical point of view, this would indicate the liberal use of carbohydrate and protein of good biological value (meat, eggs, milk, cheese) especially during the summer when poliomyelitis is prevalent.

BRITISH MEDICAL JOURNAL

No. 4466, August 10, 1946

* Food consumption in Australia. Editorial.—p. 202.

Food Consumption in Australia. A comparison of the diets in England and Canada with those of Australia and the U. S. is made. Experience with rationing in England has so far justified the old-fashioned advice that it is wise to leave the table feeling slightly hungry. There is no evidence that anyone is physically the worse for shortage of food and several of the investigators contend that children, with their special allowances of "protective foods" are actually better nourished than before the war. However, the British housewife, tired to the point of neurosis by the intricacies of rationing and weary of waiting in queues, deserves to be heard much more loudly among those responsible for planning international food policy.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 131, August 17, 1946

* Fibrinogen and dietary protein. Editorial.—p. 1356.

Vol. 131, August 24, 1946

* Mineral oil in foods. Editorial.—p. 1426.
Mental health radio programs. Editorial.—p. 1426.

Vol. 132, September 7, 1946

* Are amino acids new miracle drugs? Editorial.—p. 27.

Fibrinogen. Recent studies on chicks indicate that the level of plasma fibrinogen can be influenced by the nature of the diet much more readily than can that of the serum proteins. As the protein intake increased, the fibrinogen level of the plasma dropped. On a protein deficient diet the plasma fibrinogen increased, whereas the characteristic decrease of serum protein was observed. The formation of fibrinogen seems to be essentially independent from that of the serum proteins.

Mineral Oil in Salad Dressings. Attention is called to the occurrence of fecal incontinence due to the ingestion of excessive quantities of mineral oil by unsuspecting patrons of restaurants where mineral oil has been substituted for edible oils in salad dressings. It has been shown that mineral oil may interfere seriously with the absorption of carotene, vitamin D, calcium, phosphorus, and vitamin K. Therefore, it should not be used indiscriminately in foods.

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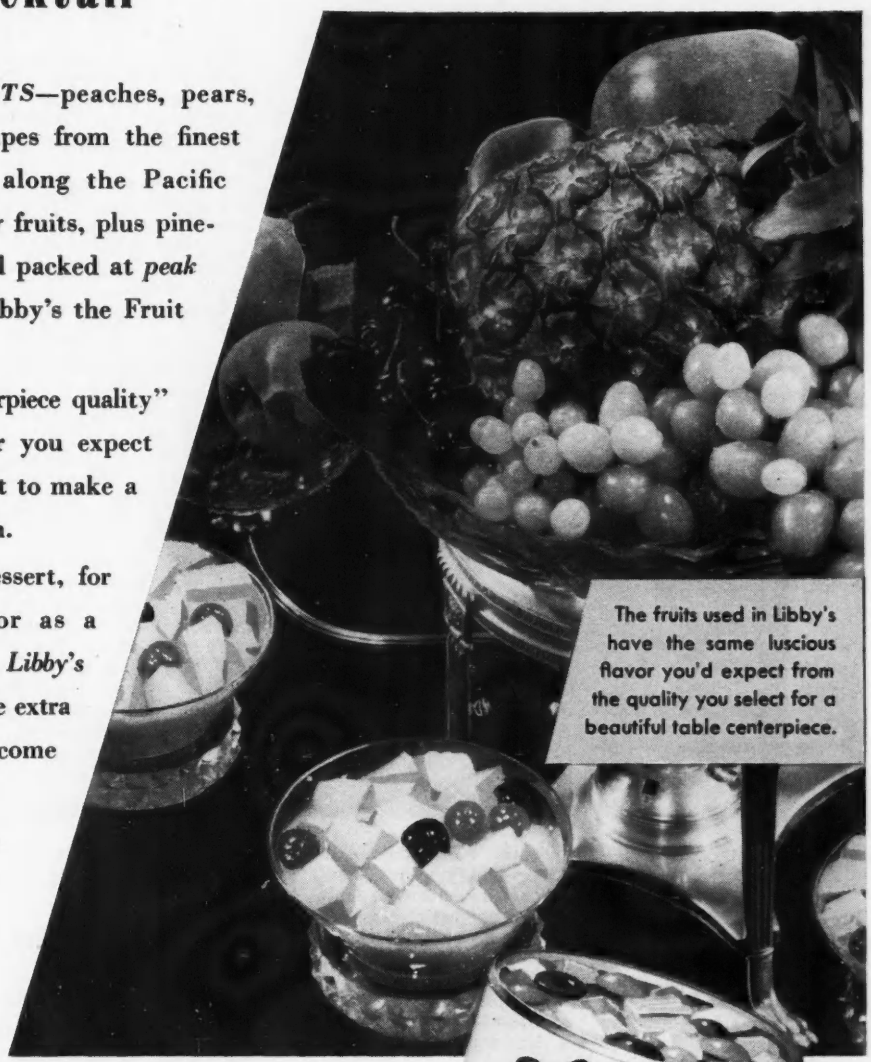

The fruits used in Libby's have the same luscious flavor you'd expect from the quality you select for a beautiful table centerpiece.

Amino Acids. Extravagant advertising claims for the use of a new amino acid preparation in the treatment of gastroduodenal ulcers are here reported. The comment is made that it is unfortunate that the terms of the Federal Trade Commission Act do not permit adequate control over such advertisements when they appear in professional publications.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 164, August, 1946

* Factors affecting the enzymic destruction of carotene in alfalfa. H. L. Mitchell and S. M. Hauge.—p. 543.
* Tryptophane studies. I. The effect of niacin on the utilization of tryptophane. W. A. Krehl, J. de la Huerga, and C. A. Elvehjem.—p. 551.

Enzymic Destruction of Carotene in Alfalfa. Enzymic destruction of carotene in alfalfa leaves was retarded as long as the tissues remained turgid, but increased rapidly with wilting. Since the loss of carotene was very rapid when the cells had been ruptured or otherwise modified by freezing, it appears that cell permeability limits carotene destruction. Under field conditions, little loss of carotene occurs until wilting takes place. Soil fertility had no significant effect on the carotene-destroying activity of alfalfa leaves. As the plants approached maturity, there was a slight decrease in carotene-destroying activity. There were not consistent differences in the carotene-destroying activity of the four varieties of alfalfa studied. Enzymic destruction of carotene during field curing appeared to be greater than destruction by light.

The Effect of Niacin on the Utilization of Tryptophane. The utilization of tryptophane and niacin by rats on rations containing corn grits and corn grits plus niacin was determined by means of a balance study, and the results indicate that niacin improves the utilization of tryptophane from about 30 to about 70 per cent. Over 100 per cent of the ingested niacin was accounted for in all cases. The carcass content of niacin and tryptophane was remarkably constant.

THE JOURNAL OF NUTRITION

Vol. 32, August, 1946

* Some effects of dietary oxalate on the teeth of white rats. R. A. Gortner, C. M. McCay, J. S. Restarski, and C. A. Schlack.—p. 121.
* Depletion of hepatic reserves of vitamin A and carotene in cattle. P. R. Frey and R. Jensen.—p. 133.
* Thiamine excretions and blood levels of young women on diets containing varying levels of the B vitamins, with some observations on niacin and pantothenic acid. H. G. Oldham, M. V. Davis and L. J. Roberts.—p. 163.

Dietary Oxalate and Rats' Teeth. Small amounts of soluble oxalate in the food or drink produced a hard deposit on the teeth of rats, which grossly resembled human dental calculus. The extent of this encrustation, which is presumably calcium oxalate, varied with the concentration of oxalate consumed and with the length of the experiment. Because of this phenomenon, oxalic acid solutions having a *pH* as low as 2.1 did not, *in vivo*, etch the enamel of the teeth of rats, in contrast to the action of other common food acids (citric, lactic, phosphoric, sulfuric) at even higher *pH* levels. When oxalic acid or its sodium salt was present in the rat's food or drink the decalcification of teeth, which accompanies ingestion of phosphoric and citric acid solutions, diminished or disappeared. Essentially complete protection against the etching action of orange juice was afforded by a concentration of 0.1 per cent oxalate in the juice. Natural oxalate-containing foods, such as spinach and rhubarb, when incorporated into the diet in a manner which did not remove the soluble oxalate prior to ingestion, produced the characteristic protective films on the molars of rats within one week. Inasmuch as these experiments were devised to give clear cut results within a short time, caution must be exercised in interpreting these data with respect to human practices. It is hoped, however, that further studies using foods with moderate levels of "soluble" oxalate may offer some insight into the dietary control of dental calculus and caries initiation.

Hepatic Reserves of Vitamin A and Carotene in Cattle. The rate of depletion of initially large hepatic reserves of vitamin A and carotene is given for 140 steers over an experimental period of 166 days. The animals were divided into two dietary groups. One group was on a fattening ration low in carotene and the other on a maintenance ration relatively high in carotene. The rate of depletion of the hepatic reserves of vitamin A and carotene decreased as the liver reserves of the two constituents decreased. No clinical evidence of avitaminosis A was observed in any of the animals, indicating the possibility of extremely low levels of vitamin A reserve in cattle without producing symptoms of avitaminosis A. Hepatic reserves of vitamin A were found to be more readily depleted than were hepatic reserves of carotene. It was found that hepatic reserves of carotene are maintained in cattle in direct proportion to the carotene intake. An increasing rate of loss of hepatic reserves of vitamin A occurred with decreasing carotene intake.

Thiamine Excretions of Young Women. Daily urinary and fecal thiamine excretions, test dose returns, blood thiamines, and 1-hr. fasting thiamine excretions of 12 women were determined on various levels of intake over a period of eight months. Intakes of 0.14, 0.20, and 0.36 mg. per 1000 calories were judged inadequate on the basis of urinary excretions and test dose returns. On an intake of 0.51 mg. per 1000 calories, the excretions increased somewhat but still remained low. That the tissues were not saturated at this level was further indicated by the facts that (a) during subsequent supplementation the excretions were higher the last three days than the first three; and (b) in the final period on an intake similar to that previous to supplementation, both daily urinary excretions and test dose returns showed increases. It is suggested that the total daily thiamine intake should probably not be less than .1 mg. per kg. of body weight. Fecal thiamine excretions for different individuals were relatively constant throughout the study. Average daily urinary and fecal excretions of niacin also remained relatively constant at approximately 1.0 mg. each, regardless of the levels of intake. Total excretions of pantothenic acid closely approximated the intakes at each level, by far the larger proportion being excreted in the urine.

THE JOURNAL OF PEDIATRICS

Vol. 29, August, 1946

* Epidemiologic studies in dental caries. I. The pattern of dental caries in Iowa City children. J. D. Boyd and V. D. Cheyne.—p. 157.

Dental Caries in School Children. This study is based on the records of 101 children of Iowa City, Iowa, who were examined not less than six times each during an aggregate period which averaged more than five and one half years for each child. Caries was practically universal in the members of the group and the tendency to progress with the passage of time likewise was almost universal. The average rate of increment approximated four tooth surfaces per annum. The loss of teeth through decay, however, was negligible. Prevention of tooth mortality may be credited to the recurrent dental service the children were receiving. It is significant that such dental therapy did not prevent initiation of new areas of decay. The course of each child's caries was erratic, being interrupted by intervals during which no new advance could be detected. The nature of the data emphasizes the need for long-term studies of caries progression in individual children as a measure of effective-

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ness of caries control, in contrast to the cross-sectional methods of caries survey which have been commonly employed.

THE LANCET

Vol. 2, August 3, 1946

* Folic acid in the treatment of pernicious anemia. J. F. Wilkinson—p. 156.
* Fat digestion in sprue studied by intestinal intubation. G. A. Smart and R. Daley.—p. 159.
* Diet and structure in dental caries.—p. 165.

Vol. 2, August 10, 1946

* Grey hair in ill-nourished children. L. Nicholls.—p. 201.

Folic Acid Treatment for Pernicious Anemia. The case records of five patients showing the typical uncomplicated clinical picture of relapsing pernicious anemia-megalocytic anemia, megaloblastic marrow, and achlorhydria with no signs of neurological involvement and their response to treatment with folic acid are presented. These patients were either untreated or had had no effective treatment for some months. During a preliminary control period of two weeks in which no treatment was given, the reticulocyte count remained low, and the red cells and hemoglobin did not show any rise.

The dosage of folic acid used was 20 mg. daily by mouth. This amount was reduced to 10 mg. when progress became well advanced. In all five cases the reticulocyte count rose and sternal punctures showed a predominantly normoblastic marrow after several days of folic acid therapy. This improvement continued.

These results showed clearly that synthetic folic acid will bring about remissions in patients with true Addisonian pernicious anemia, and the responses seemed comparable in every way to those obtained with the best prewar liver extracts.

Digestion in Sprue. The findings in this investigation are of no value in clarifying the cause of sprue but they suggest another approach for further research. Ten patients with tropical sprue and eight patients who gave no history of gastrointestinal disorders were used as subjects.

The patients received no breakfast. A Miller Abbott tube was passed into the small intestine and the fasting juice collected for 20 min. The patient then swallowed 25 ml. of olive oil; suction was continued; and when fat began to appear in 30 to 90 min.; the specimens were collected until they no longer contained fat.

The material aspirated from sprue patients consisted of whitish threads and clumps suspended in a relatively clear bile stained fluid, while that from the controls had the appearance of a uniformly suspended bile stained emulsion. The extent of the abnormality in the sprue patients varied in different subjects. However, in general, there was a rough correlation between the clinical severity of the disease and the degree of clumping.

It appears that in the sprue syndrome, fat is emulsified and hydrolyzed. The abnormality seems to be either in the aggregation into clumps and threads of the fatty material or the failure to disperse such aggregations if they occur as a transitory phase of normal digestion.

Diet and Dental Caries. This article raises again a number of the questions which have arisen in an attempt to explain the increasing incidence of dental caries as civilization has progressed. Nothing new is added. The well-known theory that carbohydrate breakdown produces lactic acid which dissolves the enamel doesn't fit all known facts. The theory that proteolytic organisms may start the attack by producing dissolution of the organic matrix of the enamel, thus causing the inorganic prisms to disintegrate needs further investigation. Large scale experiments among school children to evaluate the addition of extra vitamin D to the diet have not been very conclusive. The study of refined and cooked foods vs. unrefined foods has been another approach.

Much work has been done in recent years toward improving the structure of the teeth, particularly the enamel on the hypothesis that the better the structure, the lower the incidence of dental caries. It has been concluded, however, that the structure of the enamel in human beings is better than in wild animals which are almost free from the disease until subjected to artificial alteration of their diet. Further research is indicated perhaps with special reference to the mechanics and chemistry of food in relation to the teeth rather than the structure of the teeth themselves.

Deficiencies as Cause of Grey Hair in Children. Several years ago it was recognized that infants weaned on cereal gruels showed some loss of hair and the hair grew wavy, grey, and finer than normal. This phenomenon was very uncommon in older children, however. The author points out that recently he has seen several cases in Malaya of greying of hair in children ages five to 12 years who had been living largely on manioc root and in whom vitamin deficiencies were multiple. No change was noted in the texture of the hair. It is possible that there are two types of deficiencies caused by malnutrition.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 235, August 1, 1946

* Infectious hepatitis in Massachusetts. H. L. Hardy and R. Feemster.—p. 147.

Vol. 235, August 8, 1946

* Scurvy. I. Dogramaci.—p. 185.

Vol. 235, August 29, 1946

* Statistics of diabetes. H. H. Marks.—p. 289.

Infectious Hepatitis in Massachusetts. Infectious hepatitis occurs sporadically and in epidemic form over a wide geographical area. It seems certain that the disease is caused by a specific virus with an apparent affinity for the liver. The transmission of infectious hepatitis, on the basis of present knowledge, takes place by contact of a susceptible person with a patient having the disease or with material contaminated by the causative virus. It seems certain that the virus can be carried in food. It may be carried in water. The findings in 151 cases of infectious hepatitis in Massachusetts occurring during 1944–1945 are presented. A plea is entered for the recognition and careful handling of infectious hepatitis. This disease clearly may cause irreversible liver changes. Observations lead the authors to believe it is a serious disease in pregnant women. Gamma globulin has no place in the treatment of the active phase of infectious hepatitis. It has been shown to be capable of producing passive immunity for six to eight weeks and should be useful in the control of small outbreaks. Dietary management has been the standard weapon. A high intake of sugar by mouth was the most satisfactory measure, a daily intake of 300–400 gm. carbohydrate being a reasonable goal. Some authorities think that a high protein intake is important and quote Gyorgy's work. British workers are not satisfied that high protein feeding alters the course of the disease. It may be best not to give the liver large doses of protein to handle while it is disabled. The matter of low fat intake is not yet settled; however, experience shows that, except in the most benign cases of infectious hepatitis, the gastrointestinal tract cannot easily handle fat.

Scurvy in Children. Scurvy is still a reasonably frequent disease in pediatric practice. At least 241 clinically typical cases of scurvy were seen in the Department of

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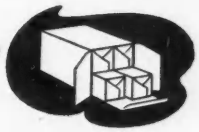

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Pediatrics, Harvard Medical School and the Infants' and Children's Hospitals, Boston, during the last 10 years. The incidence in this decade was 41 cases of scurvy per 100,000 outpatient visits compared with an incidence of 58 cases during the previous decade. The incidence decreased until 1940 following which a rise occurred during the next five years. The high cost and shortage of citrus fruits during the war years may account for this rise. The relative unavailability of physicians during the war years may have been an additional factor. Mothers should be educated concerning the vital need for regular administration of vitamin C and should be routinely checked to make certain the infant is receiving a source of ascorbic acid. The public should be educated to accept the cheaper ascorbic acid as a substitute for citrus fruits whenever the use of the latter is not feasible.

Statistics of Diabetes. This article considers the statistics of diabetes under the following headings: prevalence of diabetes, characteristics of the diabetic population, mortality from diabetes, international comparisons, trend of diabetes in wartime, significance of geographical variations in diabetes, longevity of diabetic patients; and the use of statistics in clinical diabetes.

SCIENCE

Vol. 104, August 16, 1946

* Human breast cancer and the milk factor. M. T. Macklin.—p. 168.

Cancer and the Milk Factor. Recently, it has been found that there is a milk factor productive of breast cancer in mice. Immediately warnings appeared to women who had a history of breast cancer in the family not to nurse their children. Such advice should be given very cautiously until more facts are known. According to statistics, breast cancer appears more frequently in the 40 to 50 year age group after child bearing is over, and often after the children have had offspring. In addition, it must be noted that the women who have never had children or those who have never nursed their children have cancer more frequently than the mothers who have nursed several young. It does not seem that cancer can be bred out, or that would definitely happen. The late age at which breast cancer appears is a handicap in trying to make any preventive program work.

SOUTHERN MEDICAL JOURNAL

Vol. 39, August, 1946

* The effect of caffeine on gastric secretion. V. H. Musick, H. C. Hopps, H. T. Avey, and A. A. Hellbaum.—p. 651.

The Effect of Caffeine on Gastric Secretion. The gastric secretory response to caffeine was determined in a total of 39 individuals. A caffeine test meal was performed according to the technique recommended by Ivy. Ten apparently normal patients were selected who showed no evidence of gastric disease on X-ray examination nor did they present abdominal symptoms. Twenty-five adults in the active phase of duodenal ulcer were selected at random for the experimental procedure. Gastric secretion of hydrochloric acid in the normal person is stimulated when caffeine is placed in contact with the mucous membrane of the stomach. Gastric stimulation by caffeine results in an excessive prolonged secretory response in patients with duodenal or gastric ulcer. In individuals with peptic ulcer, the degree of gastric hypersecretion following stimulation by caffeine tends to indicate the activity of the process and may be of value in predicting imminent hemorrhage or perforation. Caffeine may be an important implement in the hands of investigators in solving the etiology of peptic ulcer.

AMERICAN COOKERY

Vol. 51, February, 1946

* Another step forward in our daily bread.—p. 20.
* Milk in the human dietary. A. D. Holmes.—p. 28.
Chocolate: energy food, beverage, confection.—p. 30.
The good in tea.—p. 32.
* Effective teaching: Food a medium for developing inter-group understanding. A. Ebersole.—p. 40.
* A glossary of cooking terms. F. de N. Schroeder.—p. 46.
Patterns for school lunch.—p. 48.

Our Daily Bread. Our forefathers, due to crude milling methods, ate a highly nutritious coarse grain bread. Modern man now produces a snowy white bread, in which most of the nutrients of the natural whole wheat kernel are lost. Nutritionists who were alarmed began laying the groundwork for a bread enrichment program. Bakers enriched their bread with vitamins and iron voluntarily, but nutritionists were most concerned about the lack of calcium. Until recently the chief source of calcium in bread came from milk solids, but the shortage of cornstarch caused bakers to include calcium carbonate in baking powder.

With the new baking powder, there is an addition of calcium to the dietary without the addition of phosphorus. This tends to balance the calcium-phosphorus ratio. The calcium carbonate replaces in part or in whole other fillers in baking powder which are less valuable.

Milk in Human Dietary. Milk is probably nature's most perfect food with its phenomenal qualities for building strong bones and well developed muscle tissues in young animals and human babies. Milk protein, which supplies all the amino acids, is superior to the proteins found in cereals, fruits, and vegetables. In addition it is very economical. Although milk contains only about 4 per cent fat, it is a pure fat with high food value. Vitamin A, carotene, and a small amount of vitamin D are found in milk. It supplies the 13 elements necessary to obtain satisfactory growth, but unfortunately the amount of iron, copper, and manganese is inadequate. Babies may have "milk anemia" around five or six months if the diet does not include other iron-containing food, but anemic adults find the milk protein helpful and folic acid, one of the new vitamins found in milk, has been reported to cure one type of anemia. Milk is an excellent source of calcium. One tenth of the daily needs for nicotinic acid can be found in a quart of milk. The amount of vitamins A and D are determined by the cow's ration and quantity of sunshine which falls on her, but in any case the supply of vitamin D is inadequate for a baby.

The nutritive value of chocolate milk is less than whole white milk, for frequently cocoa sirup is added to skim milk to make the beverage. Food values are lost in the processing and handling of milk. Pasteurization causes loss of some ascorbic acid, riboflavin, and thiamin. If bottled milk is exposed to strong light or sunshine for any length of time, it loses vitamin C rapidly and seriously depletes the riboflavin and ascorbic acid. Vitamin A and carotene are also destroyed by bright light. An interesting sidelight is the fact the chocolate milk loses riboflavin very slowly when exposed to sunlight. Some abnormal body conditions and

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For quantity cooking, use either Instant or Regular Ralston. Both have added wheat germ. Both are economical. Both have a rich heart-of-wheat flavor.

diseases are treated with milk. Outstanding is the treatment of gastric ulcers with large amounts of milk at frequent intervals.

Effective Teaching. In developing inter-group understanding through foods, one must decide upon the channels through which the greatest progress can be made. The unit in a particular field, the core curriculum, work experience, and extra-curricular activities are all channels which can be used at the secondary school and college level. Provision must be made for informality so that teacher-pupil cooperation will result in reciprocal learning. The core curriculum proposes an integrated study such as "foods of other lands" in which food is linked with economics, social development, art and agriculture. Through work experience, the student is given the opportunity to work with people in actual job situations; bringing about better social understanding and improved behavior habits. Through extra-curricular activities the school, home, and community are drawn together and cooperate on common interests undertaken by the student. Food may be used as a unifier in informal community meetings of adults and older youth where exchange of ideas, fine performance, and common problems will evolve. Another aspect in the use of food to promote better relationships is the means of developing the physical ability to cooperate through improved nutrition.

Glossary of Cooking Terms. "Bun," signifying a raised, sweetened bread, frequently glazed and enriched with raisins and nuts, is derived from the Old French *buigne* and the Gaelic *bonnach*, meaning a lump on the head induced by sudden contact with a shillelagh or brickbat, and refers to the puffed up quality of the bun. "Hot cross bun" is not of Christian origin as many would expect, but rather goes back to the Greek worship of Astarte, the Moon Goddess, who served cakes of meal and honey marked with a carved cross to signify the four quarters of the moon. "Hot dog," from the Dog Latin, *Candis caldus*, originated at the Louisiana Purchase Exposition of 1904 as a precooked, hot sausage served in a split roll with free mustard. Because of its low cost and questionable ingredients it was called hot dog. "Poach" comes from the Old French *pochier*, a pocket, and its verb, *pocher*, to place in a pocket. It was a method of cooking eggs and sometimes fish by simmering in water or stock. Toast, from the Latin *torrere, tostum*, to roast or parch, in particular, bread. Associated with the word is the old English two-tined, long-handled toasting fork used before an open fire.

AMERICAN RESTAURANT

Vol. 20, March, 1946

Introducing; President Walter S. Clark, Sr.—p. 25.
* Layout pattern no. 14. C. Wagner.—p. 29.
Washington ticker tape. J. Cockrell.—p. 35.
News from the convention.—p. 38.
April seasonal food charts. G. Wenzel.—p. 48.
Federal tax calender. Horwath & Horwath.—p. 70.

Vol. 20, August, 1946

* Layout pattern no. 17. C. Wagner.—p. 34.
New fish dish for Boston.—p. 36.
Conserving cooking fats. J. A. Cline.—p. 38.
* Can food costs be controlled? R. B. Mosley.—p. 54.

Layout Pattern. This is a layout for a drive-in type of restaurant that provides for a coffee shop, seating 124 at counter and booths, and a service dining room seating 116. Sufficient equipment is incorporated to accommodate service of regular meals, short orders, fountain specialties, baked products, salads, and sandwiches. The coffee shop allows 15.4 sq. ft. of floor area per seat. The dining room requires 14.2 sq. ft. of floor area per seat. The kitchen is designed with a cook's unit composed of a cook's table, sink, refrigerator shared with the bakery unit, *bain marie*, broiler, steam table, three ranges, two fry kettles, and two griddles. To the rear of the cook's department is the bakery, equipped with three-deck bake ovens, single compartment proof box, pastry rack, and mixer. To the right of the bakery and cook's unit and facing the coffee shop are the salad and sandwich departments, composed of a 6-ft. sandwich making unit, two toasters, refrigerator, L-shaped salad preparation table, and serving shelf. Equipment for the dishwashing department, which is apart from the kitchen activities, includes a two-tank washing machine, a brush-type glass washer capable of washing and sterilizing 1600 glasses per hour, soiled and clean dish table. The basement, situated under the kitchen with entrances at the rear of the kitchen and in the lobby, is furnished with public wash rooms, locker rooms, walk-in storage refrigerators, bulk storage room, manager's office, and the vegetable preparation department.

Industrial Cafeteria Layout. This pattern is for an industrial cafeteria having double service counters and a canteen occupying an area of 13,338 sq. ft. and seating 508. Of the total area one third is allotted for storage, food preparation, and locker rooms for employees and the remainder for service area and dining space, canteen, and dishwashing. The manager's office is located so that he sees all activities in all units. All deliveries are brought to the rear entrance.

Food Cost Control. Food cost control is of first importance to every restaurant operator. The manner in which food is handled after it is purchased is more important than the actual purchasing. Buying the best merchandise available at market price, buying only what is needed, and properly using all of it is the policy to follow. Meat costs can be controlled greatly by the butcher. Overweight on 300 servings of meat means a great loss. Over-production is another loss. In meat preparation never dice anything which can be sliced and never grind anything that can be diced. Portion control is essential in food cost control. Efficient management, quality merchandise properly prepared and served, and the right selling price are essential in keeping a good volume of business.

BAKER'S HELPER

Vol. 20, August, 1946

How to make the most effective use of insecticides. Dr. E. H. Fisher.—p. 52.
Better profits from better cookies. R. J. Thelen.—p. 92.
* Hints on cake ornamenting. L. Bartl.—p. 95.
* Refrigeration for the bakery. E. G. Morgan.—p. 100.

Cake Ornamenting. Material for cake decorating should be easy to make, ready for use at any time by adding a bit of moisture, and adaptable to both wedding and birthday cakes. Roses and flowers are most in demand. Flowers should be put on cakes with care. Sprays of flowers can be varied by a swirl of leaves and by the number of leaves used. Lacework around a cake requires a steady hand, as does a scroll. Pictures accompany this article and clarify explanations.

Bakery Refrigeration. In the bakery, flour must be stored at a controlled low temperature; yeast must be refrigerated until used; eggs require a cold temperature from the time they leave the nest until they are broken and frozen; milk, lard, and ingredients for pies need refrigeration. Temperature control in making doughs is important. A mixer is designed with a cooling medium to reduce heat generated by the friction of the mixer. Temperature and humidity control in the fermenting room is essential. Refrigeration is used for retarding doughs and batters. Products may be cooled when they come from the oven. Refrigeration is used in the waxing of paper and of cartons for highly perishable products. Cake fillings and frostings need refrigeration. Design, size, and combinations of

SIX BLODGETT OVENS SERVE 12,000 MEALS DAILY AT CHICAGO VOCATIONAL SCHOOL

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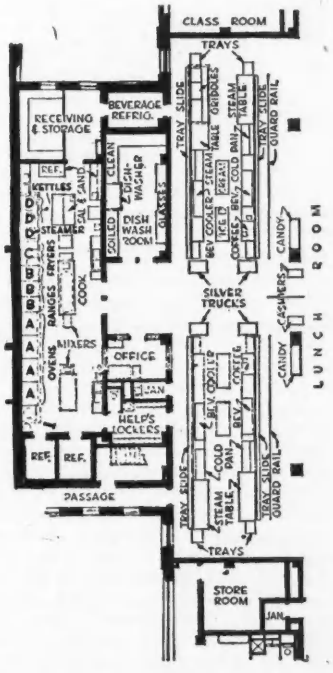
Its roasting bank consists of three Blodgett No. 952 Gas-Fired Roasting Ovens; its bake-shop four Blodgett No. 982 Gas-Fired Baking Ovens.

Features of this equipment are: the volume production in limited space, speed, accuracy and freedom from knee-high heat discomfort.

A student baker removes pan of baked goods from one of the four Blodgett No. 982 Ovens at Chicago Vocational High School.



COOKING EQUIPMENT USED:

(a) 3 No. 952 BLODGETT GAS-FIRED ROAST OVENS
1 No. 959 BLODGETT GAS-FIRED ROAST OVEN
(b) 3 Heavy Duty Ranges
(c) 3 Gas-Fired Deep Fat Fryers
(d) 1 Vegetable Steamer
2 Stock kettles.

Note: Bake shop with two No. 982 BLODGETT BAKE OVENS not shown in plan.

Designed by: Board of Education, Chicago, John C. Christensen, Architect under the direction of F. O. Washam, Director of Lunch Rooms. Installed by Alex Janows & Co.

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refrigeration are endless. Analysis should be made of the work to be done and the refrigeration set up with this in mind.

CONSUMERS' GUIDE

Vol. 12, March, 1946

Booby trapping eggs.—p. 2.
If everybody eats well in 1950.—p. 3.
* Facts in an eggshell.—p. 6.
* First call for lunch.—p. 9.
* Containers at the crossroads.—p. 12.

Facts in an Eggshell. It is now known that one doz. eggs may contain as much as 50 per cent more egg than another dozen. A dozen large eggs must weigh at least 24 oz., medium eggs 21 oz., small eggs at least 18 oz., and jumbo-sized eggs at least 28 oz. The nutritive value of the various grades of eggs are the same. The color of the yolk is no indication of nutritive value. The benefit derived from an egg is dependent upon the hen's diet and care of the eggs. All eggs should be cooked in even slow heat. Eggs are a source of proteins, rate high in iron and phosphorus, and contain lesser amounts of vitamin A, B, D, thiamin, and riboflavin. Food cost may be cut by buying the size of eggs which gives the most for the money. Using lower grades for general cooking and baking purposes is a money saver. Look for the U.S. Consumer Grade label. Dull eggshells indicate better quality than glossy smooth shells, since the dullness is a protection put on by the hen to keep out impurities and contamination. Keep eggs clean and refrigerated to prevent spoilage. Eggs are marketed in two main channels, the producers' cooperative and the egg auction. Eggs are seasonal products, having a peak production in the spring and summer, but by use of cold storage, eggs may be bought any month of the year. Cold storage eggs are not yet as reliable as fresh eggs, but they are cheaper, just as nutritious, and just as good for most cooking purposes. The production of dried eggs has increased considerably as an outgrowth of the war years. Dried eggs keep almost indefinitely, can be used in recipes wherever eggs are called for, are economical, convenient, compact, and easy to measure.

First Call for Lunch. At the present time, 8 million school children are receiving the benefits of a noonday lunch through the cooperation of local school officials and the U. S. Department of Agriculture in the Community School Lunch Program. School lunches were born of the depression to give men work and the farmer a market. The WPA and the NYA supplied needy workers to build, serve, and administer school lunch projects. The school lunch not only accomplished an emergency economic need, but served to build up the national health. The government appropriated $50 million for the school lunch program in 1944 and increased this amount as the needs became greater.

Containers at the Crossroads. In 1941, there were cans in 258 sizes on grocers' shelves. Even though net contents were printed on the labels, the differences were very confusing to the grocer and consumer and indirectly added to the cost of food. The story of the can confusion was reported in 1939 to a Congressional Committee, but nothing was done. Then came Pearl Harbor, and in 1942 the government in cooperation with representatives of the canning industry, announced the terms of an order limiting the number of cans to be manufactured and used. The only cans allowed for fruits and vegetables are the No. 2, No. 2½, and No. 10; however, exceptions were made for specialties such as baby foods. Because tin supplies were short and containers were needed for commercial and home processed foods, glass became the logical material. In early 1942 a limitation order was passed, reducing the production of jars and bottles to 28 designs. Other types of containers also had their numbers and variety cut in the interest of the war effort. The existing 400 kinds and sizes of wooden crates was reduced to 70, and paper bags were reduced from 284 to 117 sizes. Baskets and other fresh fruit and vegetable containers were limited, but controls on these items had long been operating under the Standard Container Acts. Congress has the power under the Constitution to standardize containers, while the Food, Drug, and Cosmetic Act regulations control the fill of containers shipped in interstate commerce. The control of the container starts at the factory where the manufacturer is required to submit to the Production and Marketing Administration of USDA specifications for approval and inspection. Many would like to see the wartime restrictions on containers continued.

HOTEL MANAGEMENT

Vol. 50, August, 1946

Good food hints. L. P. Degouy.—p. 14.
* How we train our staff. R. G. Jahrling.—p. 32.
Modern fashions in breakfasts. M. Casteen.—p. 34.
Basic principles of quantity cookery. A. Easton.—p. 36.
Determining deductible repair expenditures. P. Haber.—p. 38.
Thirty-six simple safeguards against electrical fires. E. W. Fair.—p. 39.
Planning properly in advance for the reception of prominent personages. A. J. Lowe—p. 40.
Building good will with box lunches. S. Thorne.—p. 45.

How We Train Our Staff. With the war at an end, many guests feel they are entitled to better service, even superior to prewar levels. The problem is difficult since the labor market is still acute. Therefore, an effective training program must be adopted to educate employees quickly yet thoroughly. The author has found that the printed material prepared by *Hotel Management* is the best basis for organizing such a program. This material covers the duties of each group of employees and gives suggestions on training procedures to department heads and supervisors. It develops qualities of leadership among supervisors and department heads, as well as stimulates interest among all levels of employees.

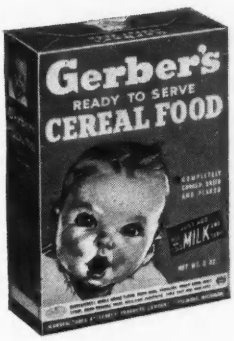
JOURNAL OF HOME ECONOMICS

Vol. 38, February, 1946

* Developing home economic leaders. B. M. Watts.—p. 65.
* Human relations in the restaurant industry. W. F. Whyte.—p. 71.
Fabric forecast. L. A. Heuer.—p. 74.
Pressure cooker gauges and food spoilage. E. J. Thiessen.—p. 85.
Effect of the war on food habits in Hawaii. E. B. Gruelle.—p. 91.
* The diet at a hostel in India. K. Hoffman and C. B. Warner.—p. 95.
Educating the food handler. B. L. Griem.—p. 98.
Elementary and secondary schools department.—p. 108.
* Social welfare and public health.—p. 109.

Developing Home Economic Leaders. There is a great need for adequately trained professional leaders. There are few institutions offering training beyond a master's degree in any branch of home economics. Any department of home economics that wishes to encourage students to take advanced degrees must have at least one person who has made some professional contribution in that branch, has a research program under way, and is interested in initiating promising students into research procedures. It is also necessary to have a sufficient number of courses of organized graduate instruction available both in the applied science in the department of home economics and in the corresponding basic sciences. To set up a graduate course is expensive, but the Purnell funds are a good resource. Purnell appointees are capable of instructing advanced students as well as initiating research in their field of study. Separation of research and teaching is fundamentally wrong and detrimental to both. Each research worker devoting one third of his time to teaching is capable of offering one graduate course each semester. The possibility of "joint" doctorates, in which the responsibility of instruction and

NOW REAL VARIETY IN CEREALS FOR SPECIAL DIETS



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Three cereals different in taste— alike in high nutrition values

With the addition of the new Barley Cereal, Gerber's now offers three cereals for patients on special diets.

These three cereals, Cereal Food (blue box), Strained Oatmeal (red box) and Barley Cereal (yellow box) differ in taste according to the grains from which they are made. All three are enriched for extra nutrition.

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thesis direction is shared by a branch of home economics and a closely related science deserves more consideration. The interest of capable young women in graduate work must be aroused. Establishment of close contact between research and teaching should help. To the young woman contemplating marriage, a salaried job at the time of graduation is more promising than several years of intensive study and meager living. However, years spent in building resources of professional knowledge and achievement are not lost if marriage is undertaken. Full-time and part-time jobs are waiting, and there are few communities in which such knowledge would not be applicable. A profession does not make one less a wife or mother, nor does a family dim professional enjoyment. There are many opening fields of specialization in home economics, but the best developed areas are foods and nutrition; however, textiles, family life, and child development are equally challenging.

Human Relations in Restaurants. The combination of a production and service unit distinguishes the restaurant industry from the factory which is purely production and the department store which is purely service. One of the largest personnel problems, then, is that of coordinating the activities of all the employees. Since the restaurant organization is made up of interdependent parts and is highly sensitive to changes taking place in the other parts, the problems resulting require great coordination. Good supervision is the big difference between a well-coordinated organization and one in which personnel friction runs rampant. The restaurant supervisor needs, in addition to a knowledge of food preparation, an ability in human relations not required of many other supervisors. He must be able to organize activities, to achieve coordination and emotional stability of employees, relieve tensions resulting from outward pressures, understand the sensitivities and behavior patterns of the employees, and show interest by being a receptive listener.

The Western Electric Co. research on encouraging workers to talk out their own problems might prove useful. First, listen, don't talk except to encourage the worker to express himself fully and freely. Second, don't argue or don't give advice. Third, don't condemn his attitudes or the behavior he reports. Fourth, pay attention to what the employee actually says and to what he wants to say. Fifth, summarize the employee's words from time to time and present them to him for comment. Effective supervision is achieved only through winning cooperation, and cooperation cannot be won without skillful listening.

Diet in India. The Agricultural Institute at Allahabad, India, trains women students in nutrition by allowing them to plan hostel menus, do purchasing, and actually prepare food. During the war, providing an adequate diet with available funds became increasingly difficult. In September, 1944, 15 students and two teachers were paying $4.20 each per month for food, fuel, and the salary of one servant. Food costs increased three to four times over those of American markets. Vegetables and fruits were often beyond reach except when locally produced, and with the dry seasons, as in September, few vegetables were available from the girls' own gardens. The main aim was to provide enough food even if it was not adequate nutritionally. Four meals a day were furnished: early morning tea, breakfast at 11:30, tea, and supper. Figures on weight changes are not available, but two or three students had swelling of feet and legs, possibly due to diet deficiencies. The diet was then studied to determine its nutritive value. The studies showed that of the minerals, calcium was the most inadequate because cost of milk prevented its use except for teas. Phosphorus and iron content of the diet seemed adequate as a result of the large amount of whole wheat flour used. The figure for vitamin A was low but the period studied came during a season when mangoes, high in vitamin A, were not plentiful. Vitamin D was no problem because of the abundance of sunshine in India. When conditions return to normal, more of the foods important for an adequate diet may once more be included in hostel menus.

Social Welfare and Public Health. The National Conference of Social Work had its annual meeting in Buffalo, New York, May 19–25, 1946. Every home economist in the social welfare or public health field should have *Table of Contents of Scrapbooks and Bibliography for Workers in Health and Welfare Agencies.* Copies are available from the AHEA. It is essential that each state social welfare and public health chairman have a directory giving the address of each member. The directories should be passed on to Frederica Beinert, director of nutrition service, American Red Cross, 529 South Wabash Avenue, Chicago, Illinois.

WHAT'S NEW IN HOME ECONOMICS

Vol. 10, August, 1946

* Careers in home economics—nutrition, consultant, maternal and child health. I. S. Wilson.—p. 2.
Science and safety in home dry cleaning. M. Foy.—p. 10.
Your nutrition library. E. N. Todhunter.—p. 16.
Allegany County, Maryland school lunch program.—p. 25.

Careers in Home Economics. A nutrition consultant in a state department of health must have a degree in home economics, and a year of graduate study is important. A master's degree in public health nutrition is desirable, and one must have experience as a staff member working under the supervision of an older trained person. She must have a real and abiding love for people and realize that people who need her help most will not always be on her socioeconomic level. She is chiefly concerned with the nutrition of mothers and children. The work involves talks, radio broadcasts, and help for private agencies in related problems. The work is hard and many times progresses slowly but the end result is always gratifying.

School Lunch Program. The school lunch program in Allegany County, Maryland, received its start in the days of WPA. When WPA went out, the Board of Education took over this responsibility. There was no trained staff. A utility company cooperated by sending a home service supervisor. With her help, a two-day training program for cooks was set up and short cuts in food preparation, menu planning, and marketing were taught. Parent education was stressed. All schools but one offer a hot lunch to the students whether they are able to pay for it or not. Financial aid is given by the War Food Administration and the health department assures the sanitation aspects. Tests have indicated that the children have better health, better attendance, and improved scholarship.

BRAZILIAN DIET AVERAGES ONLY 1600 CALORIES

Dr. W. R. Ackroyd of the Food and Agricultural Organization of the United Nations recently announced the findings of a nutrition survey made in Brazil. It was found that only 20 per cent of the industrial workers studied received adequate food for good health. The worker's average caloric intake was only 1600 calories, in contrast to the national diet of the United States which allows 3000 or more calories per man per day. The chief nutritional deficiencies among Brazilian workers were found to be calcium, iron, and protein.

In the Early Recognition of Protein Deficiency

Unsupervised dietary curtailment and self-imposed food restrictions, not infrequently observed in elderly patients and in those desirous of preventing weight gain or losing weight, are apt to lead to multiple nutritional derangements. Not the least important among these, and often overlooked, is protein deficiency.

The early symptoms of chronic protein deficiency are vague and lack specificity. Thus they escape detection unless pointedly looked for. Easy fatigability, loss of weight, anorexia, malaise, and a slight pallor due to underlying secondary anemia constitute the most common complaints. A careful history of eating habits usually discloses the true significance of these symptoms.

Detection of the earliest objective sign of protein deficiency—negative nitrogen balance—requires hospitalization for several days, in order that nitrogen intake and excretion can be accurately determined.

Prolonged protein deficiency leads to hypoproteinemia, and is readily recognized by generalized edema and by a serum protein level below the normal 7 to 8 Gm. per 100 cc.

The most dependable and effective means of preventing and correcting protein deficiency is through proper organization of the diet. The recommended intake of 1 Gm. of protein per Kg. of body weight insures nitrogen balance in normal persons. For correction of frank protein deficiency, at least 2 Gm. per Kg. of body weight—and frequently considerably more—is required.

Among the protein foods of man, meat ranks high, not only because of the generous supply of protein it provides, but also because its protein is biologically complete, applicable for the satisfaction of every protein need.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

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News Notes

Veterans Advisory Group. Cathryn R. Vermurlen has been appointed to represent the dietetic profession on the Special Medical Advisory Group for the Veterans Administration. According to law, this advisory group has been set up to "advise the Administrator, through the Chief Medical Director, and the Chief Medical Director direct, relative to the care and treatment of disabled veterans, and other matters pertinent to the Department of Medicine and Surgery." On this council are represented other branches of the medical field such as occupational therapists and physiotherapists, as well as dietitians.

An A. D. A. member, Miss Vermurlen is herself a veteran, having served with the Army as a Captain in the European Theater of Operations for many months. While overseas, she was awarded the bronze star for her outstanding work in developing the "A" ration and for adaptability in planning menus under ever-changing war conditions. Before the war, she was dietitian at Hurley Hospital, Flint, Michigan. She should be well qualified to serve on this advisory group having had experience in both civilian hospital dietetics and in the Army.

A. A. A. S. Meeting in Boston. On December 26 the meeting of the American Association for the Advancement of Science will open in Boston. At the meeting which was held in Boston in 1933–34, the membership of the Association was about 18,000; now it is almost 29,000, with about 35 affiliated associations.

First Peacetime Class Begins at Brooke General Hospital. Eight civilian women have enrolled as the first peacetime student dietitians at Brooke General Hospital, Brooke Army Medical Center, Fort Sam Houston, Texas. They began their year's internship and training in September under the leadership of Capt. Miriam Perry, teaching dietitian. The student dietitians will carry a full-time job of practical work in dietetics in addition to classes and field trips. Upon graduation they will be asked to accept commissions in the Medical Department of the United States Army.

The last wartime group of Army-trained student dietitians was recently graduated from Brooke General Hospital. Those who received diplomas were: Norma Jean Dale, Kansas City, Kansas; Marjorie Ann Haas, Akron; Mary Thomson Hansel, Logan, Ohio; Vernelda M. Jackson, Grand Marais, Minnesota; Maria A. Slonaker, Jonesboro, Tennessee; Elizabeth J. Stevenson, Las Vegas, Nevada; Gertrude I. Wlos, Chicago. This group of student dietitians took six months of their student training at Lawson General Hospital, Atlanta, Georgia, and were transferred to Brooke when Lawson was closed.

Search for Science Talent. The sixth annual nationwide competition to discover high school students with an aptitude and creative ability in science is now being conducted. Winners will be awarded scholarships totalling $11,000 to be applied to continuation of science studies on a college level. The competition is sponsored by the Westinghouse Educational Foundation, maintained by the Westinghouse Electric Corporation, and is conducted by the Science Clubs of America.

Publications for Devastated Countries. The American Book Center for War Devastated Libraries, Inc., has been established for transmitting scientific publications to foreign libraries which have been ravaged by the war. The goal it has set is 3 million scientific, educational, and scholarly books and periodicals. The address is the Library of Congress, Washington 25, D. C. The organization will serve 34 countries in Europe and the Far East which have been approved by the Department of State. In some occupied areas books were used to provide heat in camp fires, and what is left of many libraries is a mere fraction of their former stock.

Hospital Food Administrators' Institute. An Institute on Design, Construction, and New Equipment for Food Service in Hospitals will be jointly conducted by the Councils on Professional Practice and on Hospital Planning and Plant Operation of the American Hospital Association from December 2–6 at the Knickerbocker Hotel, Chicago. Among the faculty members are Owen Webber, who will discuss equipment; I. S. Anoff, president, Albert Pick, Company; Mary deGarmo Bryan, professor of institution management, Teachers College, Columbia University; Gladys Hall, executive secretary, American Dietetic Association; Martha Nelson Lewis, director of dietetics, University Hospital, Columbus, Ohio; Paul P. Logan, director of food research, National Restaurant Association; Sue Head, director of dietetics, Michael Reese Hospital, Chicago; and Ruth Kahn, chief dietitian, Veterans Administration Facility, Hines, Illinois.

Some of the topics will be: "Space Allocation and Layout for Operating Functions"; "Significance of Appearance and Decoration"; and "Factors That Influence the Type of Food Service and Layout."

Sponsoring organizations are: American Dietetic Association; Illinois Hospital Association; Chicago Hospital Council; American College of Surgeons; Illinois Dietetic Association; Chicago Dietetic Association; and the University of Chicago.

Margaret Gillam, dietary consultant of the American Hospital Association, is director of the institute, and hotel reservations and registration should be made through her. The cost for the five-day program is $25. At the dinner held on the last evening certificates will be awarded to those who attended the scheduled meetings. Registration is limited to 120 persons. Those qualified to be applicants must be administrators, assistant administrators, or dietitians. In addition, an applicant must be: (a) a personal member of the American Hospital Association, (b) a staff member of an institution which is a member of the AHA; or (c) an instructor in institution management in a university or college.

New Food Research Institute. The University of Chicago has announced the creation of a Food Research Institute to fill the need of food companies where coordination of

Jullicum

—the Oldest Preparation in the United States for making Milk Desserts with Rennet Enzyme

Dietitians prescribe rennet-milk desserts chiefly because they are nutritious and readily digested. Rennin, in the process of coagulating milk, achieves the first step in digestion. Moreover, the rennet enzyme, being a catalyst, retains its activity. Thus, after eating, it often acts to aid digestion further.

Dietitians favor JULLICUM because it adds to time-honored "Curds & Whey" the glamour of delicious appeal. Smooth and firm in texture JULLICUM entices by taste.

Pure, natural flavors impart to JULLICUM desserts a distinctive delight. No food product can surpass JULLICUM in the high quality of natural flavor sources.

Have you served a JULLICUM DESSERT recently? **Write us for a sample of your favorite flavor.** Compare dessert satisfaction—and cost.

Almond *Raspberry* *Butterscotch*
Lemon *Vanilla* *Sherry* *Orange*
Chocolate *Coffee* *Caramel*

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research efforts in industry and in universities can be realized. The work of the Institute will supplement rather than compete with research being done in industrial, scientific, and medical laboratories. Research will be carried on in such fields as: food spoilage; causes of undesirable taste, color , or odor; factors affecting quality and preservation of raw foods; food poisoning; effects of increase or decrease of storage periods; effects of soil on chemical content of plants; food problems of the physician and surgeon; food problems of the pharmacologist; and problems of nutrition.

The Institute will serve as a post-graduate training school for young biological research workers, and the present staff will supplement the work on some projects of specialists in other departments of the University.

Plans have been made for the construction of a laboratory on the campus which will house research laboratories for the staff and facilities for food companies who desire to equip, maintain, and staff laboratories for basic research within the Institute.

Dr. Gail M. Dack, bacteriologist and authority on food poisoning, has been appointed director of the new institute. In addition, the Institute is under the guidance of an industrial advisory committee and a university advisory committee.

Australian Dietitians in U. S. The New South Wales Hospital Commission has sent Eneid Davies of Sydney, Australia, to study the methods of training student dietitians, the administrative aspects of dietary departments, and new equipment in the U. S. and Canada. Formerly director of nutrition at New Castle General Hospital, she took her training at the London University and her dietetic training at University College Hospital, London. She is at present on the staff at University of Kansas Hospitals, Lawrence.

Also from Sydney, Joan Woodhill is in the U. S. doing graduate work at the University of Minnesota. Miss Woodhill trained at the University of Kansas Hospitals, under Ruth Gordon who went to Australia in 1937 to organize a dietitians' training course at the Royal Prince Alfred Hospital. When Miss Gordon returned to the U. S. in 1940, Miss Woodhill took charge of the course for student dietitians and is now supervising dietitian. She has recently been helping the staff at the University of Kansas Hospitals to prepare a bulletin containing outlines and pictures describing the training course for student dietitians.

Graduation of Student Dietitians. The 1945–46 group of administrative student dietitians at The Women's Educational and Industrial Union, Boston, completed their training with graduation excercises on September 9. Blue leather bound certificates and A. D. A. pins were presented to each student by Eva Whiting White, president of The Union. An interesting feature article about The Union graduation appeared in the early October issue of *New England Hotel and Restaurant News*. It featured the fact that the graduates were known as The Union's Flying A. S. D.'s (Administrative Student Dietitians) because of their interest in commercial aviation.

One graduate, *Estelle Beall* of the University of Washington has many hours of solo flying to her credit and has returned to Washington to a position in airline feeding. *Kathryn Berryman*, University of Georgia, and *Audrey Neff*, Pennsylvania State College, are working as administrative dietitians on the staff of the Graduate School of Business Administration, Harvard University. *Doris Funk*, Pennsylvania State College, has been appointed assistant director, Vocational Training Department, at The Union as well as a member of the faculty of the Institutional Management Department, Simmons College. *Beryl Zatulove*, Drexel Institute of Technology, is now administrative dietitian, Wellesley College.

Institute for Hospital Administrators. The 14th annual Chicago Institute for Hospital Administrators was held in the International House, University of Chicago, September 16–26 with some 100 administrators and assistant administrators attending. The Institute was under the direction of Malcolm T. MacEachern, M.D., associate director of the American College of Surgeons. The first week was devoted to a study of the basic elements of administration and professional administration in the hospital while the second week offered a series of lectures on accounting control for administrators. The program followed the general pattern of lectures in the morning and field trips and demonstrations at hospitals in the afternoons.

Frozen Cooked Food Research. In June the U. S. Army, in collaboration with the National Restaurant Association, launched a program to determine the physical and chemical changes which occur in a precooked frozen product under various storage conditions which might be encountered in commercial practice. The tests are being conducted at Wilkes-Barre, Pennsylvania. Chicken à la king has been selected for the test because it is as subject to deteriorating influences as any product normally produced for the consumer market. Four hundred samples will be tested at 30-day intervals over a period of one year and data will include: (a) packaging material, (b) packaging procedure, (c) precooking limitations, (d) freezing data, (e) refrigeration requirements in shipping, (f) effects of various storage conditions on flavor, color, texture, moisture, acidity, bacterial, and mold contamination of this type of product, (g) storage requirements and storage life of this product, as packaged.

Color photographs have recorded the original color of the cooked product of each pigmented ingredient. Two sets of samples were produced from one formula. One sample was packaged and sealed hot (212° F.); in the other, the material was cooled in a covered container to a temperature of about 58°F. before it was packaged. Some of the food was placed in moisture-vapor-proof transparent Cellophane bags while the remainder was packed in cardboard cartons.

New Hospital Administrators' Course. Washington University in St. Louis has been awarded a grant from the Kellogg Foundation for the establishment of a course in hospital administration. Dr. Frank R. Bradley is the director of the course which will be limited to 10 students for the first year. The course will be at graduate level, open to persons holding a degree from a recognized college or university. Other schools with similar courses are the University of Minnesota, which also received a grant from the Kellogg Foundation; the University of Chicago where the course was established in 1934; Northwestern University, now commencing the third year for such a program; and Columbia University where a course was established in 1945.

Convention. The American Academy of Allergy will hold its annual convention at the Hotel Pennsylvania, New York City, November 25–27. Advance copies of the program may be obtained by writing to Dr. Horace S. Baldwin, 136 East 64th Street, New York City, prior to November 10.

FAO. Washington has been chosen as the home of the commission of the United Nations' Food and Agriculture Organization which is preparing plans for a world food board. Plans which are developed will be submitted to Sir John Orr, director general of FAO, who will refer them to a full FAO conference. Action taken by the conference will then be reported to the United Nations' Economic and Social Council.

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Instructor in Nutrition and Diet Therapy, University of Tennessee College of Medicine; University of Tennessee School of Nursing; Director of Dietary Department, John Gaston Hospital, Memphis, Tennessee.

Formerly Instructor in Nutrition and Diet Therapy, Columbia University School of Nursing; Supervising Ward Dietitian at Presbyterian Hospital, New York City, 1941–1944; Research Assistant in Nutrition and Biochemistry, Children's Hospital Research Foundation, Cincinnati, Ohio, 1931–1941.

A new ninth edition — a new book!

"The author of this textbook, a pioneer of her profession in the South, is to be congratulated . . ." wrote the **Journal of the American Dietetic Association** on publication of a previous edition. The new co-author is nationally known as a teacher of Dietetics and Nutrition. Together they have created a book of surpassing accomplishment.

The most striking feature is a general tightening-up process, resulting from rewriting the entire book, which has reduced the number of pages from 1069 to 782. Yet much new and important material has been added. Several entirely new chapters and extensive new tabular material enrich this new edition.

The condensations and modifications in the manner of presenting the material are aimed to make the book a more effective teaching tool.

"PROUDFIT," as the initiate call it, has seen many revisions in the course of its twenty-eight years of life. Each new one has improved the book.

Once again, the newest findings of the research laboratory and clinical medicine have been included.

However, the numerous excellent teaching devices, the organization within the chapters, and the many other features of proven value have been retained. Some of the aids have been placed in a more accessible position.

Compare your last edition with the following CONTENTS, and see how your "bible of nutrition" is changing in response to your needs:

CONTENTS: NORMAL NUTRITION. Food and its relation to the body—Proteins—Carbohydrates—Fats or Lipides—Energy metabolism—Mineral elements—The fat-soluble vitamins—The water-soluble vitamins—Water and cellulose—Digestion and absorption—Planning diets for adequacy and economy—Feeding the foreign born—Safeguarding the food supply. NORMAL NUTRITION IN SPECIAL CONDITIONS. Pregnancy and lactation—Breast feeding—Artificial feeding of infants—Feeding of older children—Feeding the aged. DIET THERAPY. Feeding the sick—Diet in deficiency diseases—Diet in obesity and underweight—Diet in surgical conditions—Diet in fevers and infections—Diet in gastric disturbances—Diet in diseases of the intestinal tract: Constipation—Diet in disturbances of the intestines: Diarrhea, colitis, celiac disease—Diet in disturbances of the liver and gall bladder—Diet in diabetes mellitus—Diet in other glandular disturbances—Diet in epilepsy and nervous disturbances—Diet in diseases of the circulatory system—Diet in diseases of the kidney—Diet in anemias—Diet in gout and arthritis—Diet in allergic and skin conditions—Diets and tests for diagnostic purposes. PRACTICAL APPLICATIONS OF NUTRITION. ELEMENTARY COOKERY. Introduction to the study of elementary cookery—Beverages—Milk—Eggs—Cereals—Batters and dough—Soups and white sauces—Vegetables—Fruits—Salads and salad dressings—Desserts—Cheese—Meat, poultry, and fish. RECIPES, etc. APPENDIX. Dietary case studies—an outline—Methods for calculation of food values—Composition of foods, foreword—Table I: Composition of foods—Table II: Proximate composition of some common foods—Table III: Fruits and vegetables classified as to carbohydrate content—Table IV: Percentages of certain of the mineral elements in the edible portions of foods—Table V: Acid-producing foods—Table VI: Alkali-producing of the blood and Purine content of foods—Table VIII: Tables for height and weight—Table IX: Normal constituents foods—Table VII: urine in the adult—Health score card—Correlation of lecture and laboratory work in nutrition and cookery courses—Planning the course in diet therapy—General reference and reading list—Index—Recipe index.

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Frozen Doughs. A manual which will include recipes and production schedules for more than 50 frozen dough items will soon be available, according to W. E. Broeg, formerly consultant for the Quartermaster General in Washington. The manual may be obtained from Parker-Broeg, Western Office and Test Kitchen, 2442 Clement St., San Francisco.

New Course in Food Buying. Jean Hughes Voorhies reports that Wayne University, Detroit, is trying out a new method of teaching food buying and finding it very popular with the students. The course is divided into two parts—food buying from the supplier's point of view and food buying from the buyer's viewpoint.

In the first part, students study the product "on the spot." They visit a wholesale grocer to study groceries, a meat packer to study meat, and a creamery to study dairy products. In the second part, the student works with the food buyer of a Detroit hotel, hospital, restaurant, or club, choosing the one that will best prepare her for future work. Detroit concerns are giving splendid cooperation.

Birth. Mr. and Mrs. R. Hewitt Nichols became the parents of a son on August 24. Mrs. Nichols, formerly Jennie Barton, has been legislative chairman of A. D. A. and secretary of the Women's Joint Congressional Committee.

Poliomyelitis Insurance. A new insurance plan has recently been made available which costs $3 per person per year and pays up to $5000 in case the policyholder is stricken. Benefits cover doctor bills, special nurses, use of an iron lung, ambulance service, and transportation from one locality to another if recommended by the physician.

ACHA Granted $50,000. The National Foundation for Infantile Paralysis has announced the award of a five-year grant to the American College of Hospital Administrators. The purpose of the grant is to extend and strengthen the activities of the College in respect to its program of institutes for hospital administrators and to develop informational material including a monthly news bulletin. From the time of the first institute program in 1933 and the first institute conducted by the College in 1938, the participation of administrators has increased continuously. In 1941 the program was extended beyond the United States to Puerto Rico.

Frozen Food. The Refrigeration Corporation of America has released two booklets giving answers to current questions about frozen foods. *Frozen Foods Questions and Answers* covers such topics as definitions, advantages of frozen foods, storage, and processes. *Frigid-Freeze Firsts—Progress in the Frozen Food Industry* deals with distribution of frozen foods, sales promotion techniques and types and organization of stores handling these products. Although sales promotion material, the facts given may be helpful to dietitians who want to keep informed on developments in this field. The booklets are sent out in a printed file folder to which other material on the subject may be added.

New Editor. With the September issue of the *Journal of Home Economics* Zelta Rodenwold has assumed the duties of editor of the publications of the American Home Economics Association.

Bakery Products Laboratory. A new laboratory service for members is being offered by the American Institute of Baking, through which micro-analytical detection of filth in bakery products and ingredients may be obtained. Another activity of the Institute will be a special course in bakery sanitation to be held November 4–8 at the Hotel Sherman, Chicago.

Growing Peanut Market. Today farmers are getting 10 times more from peanut sales than they did in 1932. The jump from $15 million to the present $150 million can be largely attributed to the war with its resulting shortage of fats and the higher purchasing power of the consumer. Americans consumed 6½ lb. per capita during the year as compared with 4½ lb. a year before the war.

National Soup Week. October 7–13 marked the first National Soup Week sponsored by the National Restaurant Association as well as the opening of "soup season." This special soup promotion was supported by restaurants all over the nation to emphasize that soup is good food and should have a more important part in the American diet.

Flanagan-Hope Marketing Research Law. This law will require extensive work by the Department of Agriculture, state agencies, and private industry on food marketing, transportation, and packaging problems. Under the provisions of this act, the Secretary of Agriculture is authorized to appoint a committee to assist him in the application of the law. C. W. Kitchen, executive vice-president, United Fruit and Vegetable Association, asserted that the committee is purely advisory and is an effort to give industry some representation.

Obituary. Word has been received of the death of Mrs. Agnes McNulty Perry on July 31. Mrs. Perry was formerly chief dietitian at Tompkins County Memorial Hospital, Ithaca, New York.

Sister Mary Rosalia, R.N., B.S., formerly at St. Mary's Hospital in Jefferson City, Missouri, died on August 12. She had been a member of the Association since 1933.

News of State Associations

Kansas Dietetic Association. *The Sunflower*, the Association's monthly bulletin, appeared in printed form for the first time with the September issue. It has been previously mimeographed. The new format is attractive, carrying a picture of a sunflower on the masthead. The Association has accepted the invitation of the Missouri Dietetic Association to participate in its meeting November 15 and 16 at Kansas City, Missouri.

Catherine Marsh has been named as a permanent member of the institutional management staff at Kansas State College, Manhattan. Other new members at Kansas State are *Mary Briles*, *Virginia Larson*, and *Helen Perkins*.

Dr. and Mrs. Benjamin Matassarin (*née Georgia Mae Landrith*) announce the birth of a daughter. Mrs. Matassarin has been employed at University Hospitals, Kansas City.

Dietitians finishing training at the University of Kansas Hospitals are *Norma Jean Geiger*, Kansas State College, and *Verna Lee Jasper*, Iowa State College.

Maryland Dietetic Association. The Association held its annual fall picnic at the Union Memorial Hospital Nurses' Home, Baltimore.

The U. S. Marine Hospital, Staten Island, New York, has arranged with Johns Hopkins Hospital for a two-month affiliation in pediatrics, private tray service, and nursing education for student dietitians.

Virginia Wall has been appointed assistant instructor in nutrition for nurses at Johns Hopkins Hospital. She assumed her duties on October 1. *Mary Grommesh*, a recent graduate of Massachusetts General Hospital student

Notes of interest from Borden's Quality Control Labs.

Subject:

Cheese Making, the Uncanny Art

For centuries, cheese making has been an art carefully handed down from generation to generation.

At the same time, it has frequently been somewhat of a mystery, even to its most experienced practitioners. For, through the strange and not always predictable activities of molds and enzymes, the *same* cheese-making formula can not always be counted on to produce cheese with the *same subtle characteristics twice.*

SCIENTIFIC CONTROL

That is why the Borden Company is introducing scientific methods of quality control into the field of cheese making.

Although Borden's depends, to a large extent, upon many old, established cheese factories for its cheese supply—the Borden "Quality Control" Laboratories are constantly at work trying to find ways to standardize *texture, flavor,* and *appearance* in cheese.

FORTY TYPES OF CHEESES

Some idea of the size of this task may be gained from the fact that, in normal times, Borden's handles as many as *forty different types* of cheeses, both foreign and domestic.

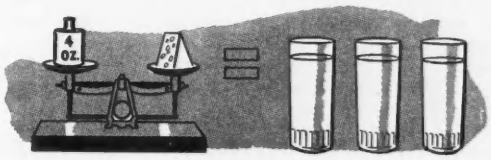
These cheeses range from the familiar 3- to 6-ounce package of American cream cheese, to the huge, 175-pound cartwheel of Swiss cheese. They

include such widely differing types of cheeses as the North of Holland, red-colored Edam cannon ball . . . the long sausage-shape Italian Provolone . . . the goat's milk Gjetost cheese of Norway.

CONCENTRATED NOURISHMENT

But what of cheese as a *food?* How does it rate in *nutritive value?* Here is a simple illustration. Approximately 4½ quarts of whole milk are required to produce one pound of American Cheddar Cheese. The cheese contains practically the same food essentials, some in altered proportions, found in the milk from which it is made.

Another way of looking at the nutritive value of cheese is this: Just **four ounces of cheese** contain the essential nutrients found in **three glasses of milk.** In other words, cheese is a **highly con-**



centrated form of nourishment in a **highly palatable form.** One reason why it has always played such an important part in the human diet.

Because cheese *is* such a *good* food, the Borden Company is constantly striving to bring to the American table even *finer* and *more nourishing* cheeses.

For cheese enthusiasts, an interesting folder, *"Principal Varieties of Domestic and Imported Natural Cheese,"* which gives pertinent information about different types of cheeses, is available upon request. For a copy, write to the Borden Company, 350 Madison Ave., New York 17, N. Y., Room 1605 B.

BETTER NUTRITION THROUGH MILK RESEARCH AND QUALITY CONTROL

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dietitian's course, has accepted a position as one of the administrative assistants at Johns Hopkins.

Michigan Dietetic Association. Plans have been completed for the fall meeting of the Association to be held Saturday, November 2, in the Green Amphitheater of the Rackham Building, Ann Arbor. Elmira Blecha, dietitian at University of Michigan Hospital is general chairman of the meeting. The program includes addresses by the following people: Dr. James L. Wilson, professor of pediatrics and communicable diseases of the University Medical School, who will speak on "Progressive Methods of Child Feeding"; Marjorie Morrison, nutritionist, U. S. Public Health Service, whose topic will be "Public Health Surveys in Michigan"; "Personnel Relations" will be the subject of a talk by Dr. Phillip J. Olen, personnel director, University of Michigan Hospital; and Dr. Muriel Meyer, instructor in internal medicine and research assistant in blood diseases at University Hospital, will have as her topic "Practical Applications of Folic Acid."

Nebraska Dietetic Association. Edith Bettinger, director of the Red Cross Nutrition Service and chairman of the State Nutrition Committee, addressed the Lincoln institutional directors and dietitians at their first fall meeting. Her topic was "My Observations of the School Lunch Programs in Nebraska." In part, she said: "Over half a million dollars have been allotted this state for the school lunch program. We must make this program effective, so that it will be continued. Some organization is needed to bring before the communities ways by which they can supply and equip a school lunch setup in order to get federal aid." It was suggested that the organization as a group contribute suitable recipes for a concentrated dish in quantity of 50 servings, which could be published for use of school lunch managers throughout the state.

Frances Olson, a graduate of St. Marys Hospital, Rochester, Minnesota, training course, has accepted the position of therapeutic dietitian at St. Elizabeth's Hospital, Lincoln. *Agnes Richling* has resigned as dietitian at Douglas County Hospital, Omaha.

Pennsylvania Dietetic Association. In Philadelphia, the local association began its fall meetings with a "get together" on the grounds at Chestnut Hill College. The Philadelphia Association has distributed to its members an attractive printed program for the coming year. Seven meetings are planned, plus the fall "get together," a Christmas party, and the annual banquet in May. The new officers are: President, Evelyn Carpenter; Vice-President, Julia Amerise; Secretary, Margaret Madden; and Treasurer, Beatrice Mason.

Natalina Scardamaglia has resigned at Women's Hospital, Philadelphia, and has moved to New Jersey. *Maxine E. McCown*, formerly at Osteopathic Hospital, Philadelphia, has assumed the duties of chief dietitian, Abington Hospital, Philadelphia. *Mary Eckhardt Ritten* is teaching dietetics at Bryn Mawr Hospital. *Florence Lehman*, Temple University, is now Mrs. Verlin L. Hatfield and is living in Kansas. *Lila Hainer*, associate professor of home economics, Drexel Institute, Philadelphia, has retired. Her position is being filled by *Madeline Burleigh*, formerly of Colonnade Lunch. *Dorothy Mittelstadt Dean* has a new baby boy.

News about Members

The following members of the American Dietetic Association have recently accepted new positions or changed professional affiliations:

Miriam Meck Adams is now with Lankenan Hospital, Philadelphia. She has been previously employed by Reading Hospital, Reading, Pennsylvania.

Anne L. Bass, following her separation from the Army, is now head dietitian at the new Lebanon Hospital, Bronx.

Margaret R. Becker, formerly a Wave stationed at Great Lakes Naval Training Station, has accepted a position with Gimbel's Department Store, Milwaukee, as dietitian.

Elizabeth J. Beidelman is working as therapeutic dietitian at the University of Chicago Clinics. She recently graduated from the Seattle Course for hospital dietitians.

Gladys M. Black has moved to Omaha, Nebraska, to become cafeteria manager, University of Omaha.

Ella R. Bodal has accepted an appointment at Children's Hospital, Honolulu, Territory of Hawaii.

Ethel Louise Bovey is now connected with Hotel Warden, Newark, Ohio, in the capacity of dining room manager. She was formerly associated with The Manor Restaurant, Springfield, Ohio.

Christine Braddock is the new head manager, Missouri School of Mines Emergency Cafeteria, Rollo, Missouri. She has previously been relief dietitian, Pennsylvania Hospital, Department for Mental and Nervous Diseases, Philadelphia.

Charleen Burris, is now assistant dietitian of women's residence halls, University of Kentucky, Lexington.

Sue Clarke has resigned her position with University Hospital, Augusta, Georgia, to accept a post with Eastern State Hospital, Williamsburg, Virginia.

Edna Mae Couch has left Alton State Hospital, Alton, Illinois, and is now living in Oklahoma City.

Betty Born Cox, formerly dietitian at Doctors Hospital, Washington, D. C., has accepted an appointment at Cowell Hospital of the University of California, Berkeley. She hopes soon to join her husband in China.

Miriam Louise Diggs is now on the staff at the University of Michigan Hospital, Ann Arbor.

Quindara Oliver Dodge, director, Vocational Training Department, The Women's Educational and Industrial Union, is taking a year's sabbatical leave of absence.

Doris Driggs, formerly a student dietitian at Johns Hopkins Hospital, is now employed by Stamford Hospital, Stamford, Connecticut.

Mary T. Dunne was recently appointed head dietitian at Sergeant Hall, University of Pennsylvania, Philadelphia.

Dorothy Ellsworth, on completion of training at Massachusetts General Hospital, was appointed dietitian, Utah Valley Hospital, Provo, Utah.

Rosemary Folgate, former Medical Department Dietitian, is now therapeutic dietitian at Chicago Lying-In Hospital.

Sina Faye Fowler has been transferred from the U. S. Marine Hospital, Chicago, to the U. S. Marine Hospital, Staten Island, New York, where one of her duties will be to establish an outpatient food clinic.

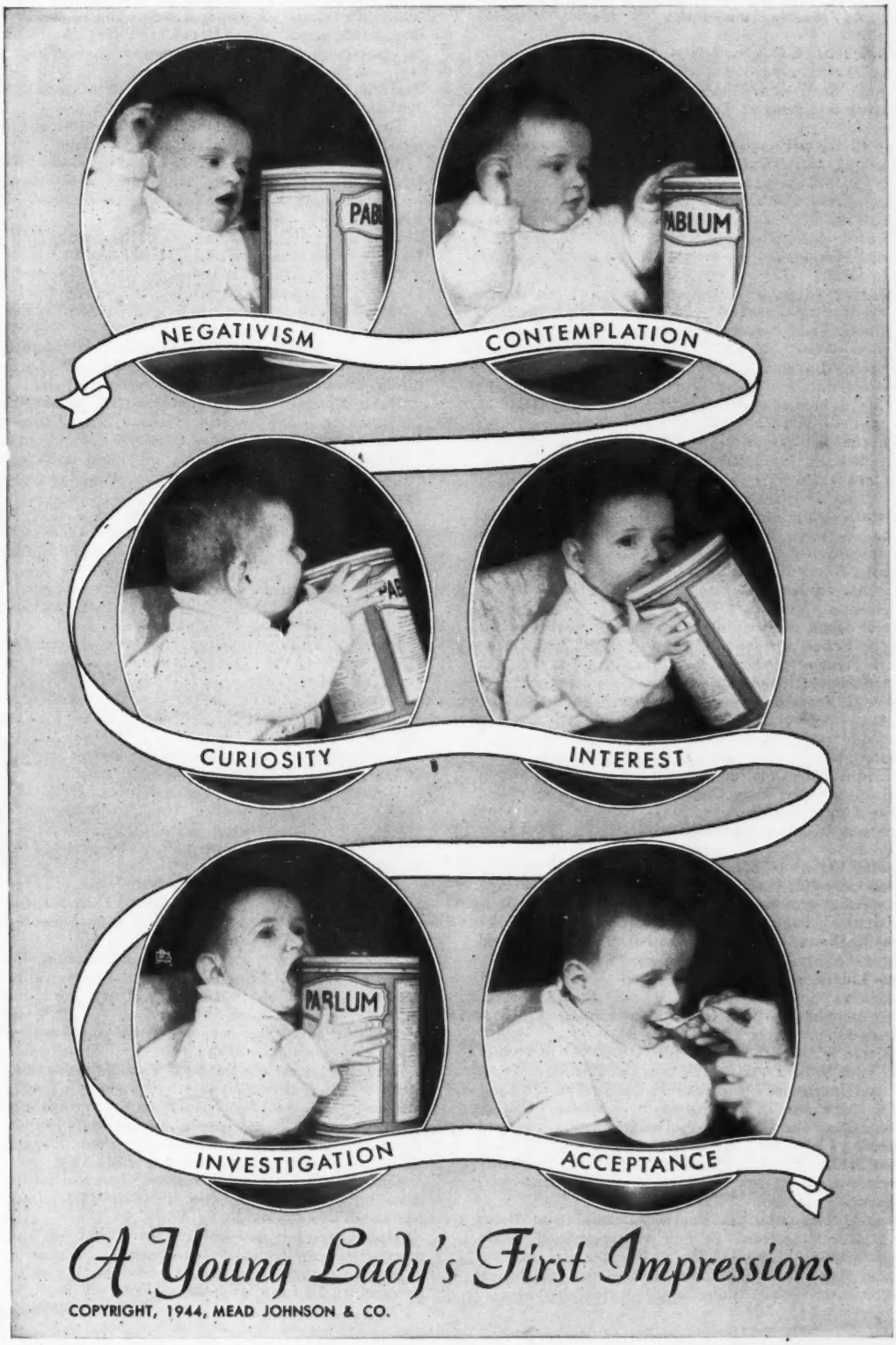
Hortense Glenn, formerly assistant to the director, Dietetic Department, University Hospital, Cleveland, will be resident instructor in home management, School of Home Economics, Florida State College for Women, Tallahassee.

Lucille Gotham is newly employed at Battle Creek Sanitarium, Battle Creek, Michigan.

Marion E. Gray, formerly food consultant to Air Quartermaster, Army Air Forces, is now chief home economist for Marshall Field and Company, Chicago.

Marjory Gray, upon completion of student dietitian's training, has accepted a position as therapeutic dietitian, St. Mark's Hospital, Salt Lake City.

Lois Gumpper, having graduated from the approved course for student dietitians at Henry Ford Hospital, Detroit, has been appointed assistant dietitian, Wittenberg College, Springfield, Ohio.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Marie Habina, formerly a student dietitian at Mt. Sinai Hospital, Philadelphia, has accepted a position as therapeutic and teaching dietitian, St. Mary's Hospital, Philadelphia.

Martha Jean Hadley has accepted a position as assistant dietitian at the University of Missouri Veterans Cafeteria, Columbia. She recently finished the administrative course for student dietitians at Texas State College for Women, Denton.

Mary C. Heltzel has accepted a position as therapeutic and teaching dietitian at St. Joseph's Hospital, Baltimore. She has just completed her training in the approved course for dietitians at St. Marys Hospital, Rochester, Minnesota.

Onalee Hostetler is a new member of the Dietary Department, Grace Hospital, Detroit.

Martha Houghtaling is now staff dietitian, Indianapolis City Hospital.

Lucia Hunt has accepted a new position with the Georgia Warm Springs Foundation, Warm Springs, Georgia. She was formerly head dietitian, Charleston General Hospital, Charleston, West Virginia.

Marjorie Hutchison's first position since completing student dietitian's training at St. Luke's Hospital, New York City, is that of teaching dietitian, Reading Hospital, Reading, Pennsylvania.

Catherine M. Jackson has accepted a new position with North Side Unit, Youngstown Hospital, Youngstown, Ohio.

Eva Jensen, formerly an Army dietitian, is now dietitian, Harbor General Hospital, Torrance, California.

H. Ruth Johnson, who has been dietitian, Saratoga Hospital, Saratoga Springs, New York, has accepted an appointment as head dietitian, St. Joseph's Hospital, Lancaster, Pennsylvania.

Mary Maren Johnson is employed as dietitian at New York Hospital, New York City.

Crystal Jones, formerly dietitian at Methodist Hospital, Houston, Texas, is now assistant manager, Emergency Cafeteria, School of Mines and Metallurgy of the University of Missouri, Rollo, Missouri.

Rubye G. Jones is now chief dietitian, University Hospital, Augusta, Georgia. She left a position with Anniston Memorial Hospital, Anniston, Alabama.

Eleanor King's first position after training at Henry Ford Hospital, Detroit, is that of ward dietitian, Montefiore Hospital, New York City.

Ferne King is now employed in the Food Administration Department, Rochester Institute of Technology, Rochester, New York.

Dorothy Larsen is therapeutic ward dietitian, Home for Crippled Destitute Children, University of Chicago. She is a recent graduate of the student dietitian's training course at the University of Michigan Hospital, Ann Arbor.

Ruby Ledbetter is now with Baptist Memorial Hospital, Memphis. She was recently discharged from the Army.

Anne Linder has accepted a position as assistant dietitian, Geneva General Hospital, Geneva, New York. She recently completed student dietitian's training at Albany Hospital, Albany, New York.

Marjorie M. McKinley has been appointed acting director, Vocational Training Department, Women's Educational and Industrial Union and on the staff of the Institutional Management Department, Simmons College, Boston, during Quindara Oliver Dodge's sabbatical leave of absence.

Ellen McMurray, following separation from the Army, has become assistant director of residence halls, University of Missouri, Columbia.

Leona Millard, who has completed training at Henry Ford Hospital, Detroit, is now therapeutic dietitian, Blodgett Memorial Hospital, Grand Rapids, Michigan.

Jessie May Moseley is now on the staff at Baptist Hospital, Birmingham, Alabama.

Gloria Musgrave is the new assistant administrative dietitian and instructor in home economics, Bowling Green State University, Bowling Green, Ohio. She recently completed her training at Henry Ford Hospital, Detroit.

Venusta Paolinelli is now employed by the South Haven Hospital, South Haven, Michigan.

Ruth S. Pelton has been appointed head dietitian, Bethany College, Bethany, West Virginia.

Dr. Magda E. Peppendahl has left Detroit and is now associated with St. Mary's Hospital, St. Louis.

Virginia Peschel has recently joined the staff at Saginaw General Hospital, Saginaw, Michigan. Miss Peschel is a recent graduate of the training course given at Michael Reese Hospital, Chicago.

Jean Petchell is a new member of the dietary staff at the University of Michigan Hospital, Ann Arbor.

Margaret Pettijohn has been appointed to the staff of the Dietary Department, City Hospital, Indianapolis, Indiana.

Susan V. Prater is now working at Grace Hospital, Banner Elk, North Carolina.

Lottie M. Reed has resigned from Grace Hospital, Detroit, to go to The Cottage Hospital, Santa Barbara, California, where she will be administrative dietitian.

Helen Rhodes, formerly dietitian, Methodist Hospital, Indianapolis, is now research dietitian, State University of Iowa Hospital, Iowa City.

Julia Bell Richards has been appointed therapeutic dietitian, Vassar Brothers Hospital, Poughkeepsie, New York.

Rebecca M. Roseberry is now on the staff of Holston Valley Community Hospital, Kingsport, Tennessee. She formerly worked at Amarillo Army Air Field, Amarillo, Texas.

Sister M. Hildegard Wehrman is now assigned to St. Francis Hospital, Peoria, Illinois. She was previously at St. Joseph's Hospital, Keokuk, Iowa.

Sister M. Pierre Sullivan has been shifted from St. Elizabeth Hospital, Youngstown, Ohio, to St. Joseph Hospital, Lorain, Ohio.

Sister M. Reinhilda Aldrian has been transferred from St. Joseph's Hospital, Keokuk, Iowa, to St. Francis Hospital, Peoria, Illinois.

Gladys Elaine Slavin is now connected with Northwestern Military Academy, Lake Geneva, Wisconsin.

Helen Slingsby, formerly nutrition adviser for Eastman Kodak Company, Rochester, New York, has accepted a new position as dietitian in the Aileen Rockwell Hall, freshman women's residence hall, Colorado State College, Fort Collins.

Elizabeth Stenborg, following completion of her student dietitian's training at Johns Hopkins Hospital, has been appointed assistant dietitian, Huntington Memorial Hospital, Pasadena, California.

June Storbeck is now therapeutic and teaching dietitian, Christian H. Buhl Hospital, Sharon, Pennsylvania. She recently finished her training at Henry Ford Hospital, Detroit.

Janet M. Stuart has been appointed to the staff of City General Hospital, Cleveland.

Thelma Sumner is a new staff member at Reading Hospital, Reading, Pennsylvania. She was previously with Miami-Battle Creek Sanitarium, Miami Springs, Florida.

Agnes P. Teske, has been promoted from first assistant dietitian, Vassar Brothers Hospital, Poughkeepsie, New York, to the position of chief dietitian.

Grace C. Thompson has resigned her position as chief dietitian at Vassar Brothers Hospital, Poughkeepsie, to live at her home in Wiccopee, New York.

Mabel Vlasak is now working for L. S. Ayers and Company, Indianapolis department store, as dietitian.

Maxine Walter has accepted a new position as assistant therapeutic dietitian, Providence Hospital, Portland, Ore-

Requires no sugar —and practically no work!

3 EASY JELL-O BEAUTIES:

A green-and-gold parfait of Lime Jell-O flakes and orange slices. A dish of brilliant Cherry Jell-O with snowy whipped cream. A tart of Orange Jell-O topped with one ripe, red strawberry.

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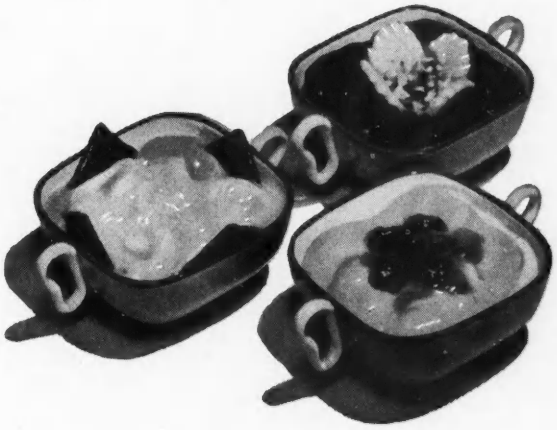

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Chocolate cookies on cream-smooth Butterscotch. Banana slices and nuts on Chocolate. Rich red strawberry jam on Vanilla. (Jell-O Vanilla Pudding also makes a delicious Vanilla Sauce for fresh fruits. Simply increase milk by one half.)

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gon. She recently completed her training at Cincinnati General Hospital, Cincinnati.

Catherine F. Walters has returned from Germany after spending 18 months as a member of the UNRRA staff. She is returning to the dietary staff of Florida State College for Women, Tallahassee.

Frances Walters is now working as assistant director in one of the resident dining halls at Stanford University, California. She left a position with Duke University Hospital, Durham, North Carolina.

Gwen H. Wedlake, recently separated from the Army, is now assistant dietitian, Olive View Sanatarium, Olive View, California.

Helen Virginia Weinman is now on the staff of Allegheny General Hospital, Pittsburgh. She was formerly connected with Yale University, New Haven, Connecticut.

Barbara Wheelock, upon finishing the course for student dietitians at Eastman Kodak Company, Rochester, New York, has been appointed assistant dietitian, Veterans Cafeteria, Florida State College for Women, Tallahassee.

Doris Williams is the new chief dietitian, King County Tuberculosis Hospital, Seattle.

Elizabeth Wirtenberger has accepted a position as assistant therapeutic dietitian, Montefiore Hospital, New York City. This is her first position since completing training at Henry Ford Hospital, Detroit.

Madeline Wiseman, formerly associated with the Devereux Ranch School, Goleta, California, is now connected with The Santa Barbara School, Carpinteria, California.

Irene L. Yakulis has been appointed manager at the Mt. Lebanon Public Schools Cafeteria, Pittsburgh, following her release from the Army.

Doris Zumsteg has been appointed director of home economics for Premier Foods in New York City and will assume the firm's trade name, "Betty Brooks."

Announcements of the following marriages of A. D. A. members have been received in the JOURNAL office:

Constance Adamek (née Wheeler) is living in Iowa City, Iowa, and is working part time at Mercy Hospital. She recently completed the Veterans Administration training course at Hines, Illinois.

Lt. Winnifred Askew, following her separation from the Army, was married to Thomas Trunzo.

Beulah Henne Ballard, following her recent marriage, has moved to West Lafayette, Indiana, from Flint, Michigan, where she was on the staff of Hurley Hospital.

Betty Barnett is now Mrs. Robert Clark and is living in Lincoln, Nebraska.

Martha E. Bately's marriage to Francis B. Young has been announced. They are living in Farmville, Virginia.

Florence Chernow, a life member of the A. D. A., is now married to Dr. Simon Kurinsky and is living in San Francisco, where her husband is a physician and surgeon.

Evelyn Corvin (née Davis) is now living in Dayton, Ohio.

Josephine Wilson Hicks has moved to Ames, Iowa, following her marriage on July 16. Mrs. Hicks was formerly nutrition instructor at St. Mary's College, Leavenworth, Kansas.

Harriet Roberta Lescalleet, formerly 1st Lt. in the Army, is now married to Stanley H. Wertz and is living in Memphis, where she is working with the Veterans Administration at Kennedy General Hospital.

Lois Ludemann was recently married to John J. Blumthal and is living in Bellwood, Illinois.

Stella Maisner is the new Mrs. William A. Brinkley and is making her home in Leverett, Massachusetts.

Lt. Alice L. Meyer, following her discharge from the Army, was married to C. L. Stairet. She is at present attending Washington State College, Pullman, Washington.

Lillian Myers became the wife of Dr. Leopold Reiner on September 22. Dr. Reiner is associated with Beth Israel Hospital, Boston.

Helen Perkins on August 20 was married to Russell Radke. The couple are living in Manhattan, Kansas.

Margaret Wheat (née Hawley) is now living in Manchester, New Hampshire.

Lily Stensland is the new Mrs. H. H. Bryon, Jr.

Pauline Upson was recently married to Carl Wallace. She is continuing her work with the Niagara Falls Memorial Hospital, Niagara Falls, New York.

News from Advertisers and Exhibitors

Westinghouse Electric Corporation has announced the appointment of Audrey Mae Goodling as home economics supervisor for the Middle Atlantic district. Miss Goodling has served as home economist for the Metropolitan Edison Company, Reading, Pennsylvania, and as test kitchen supervisor for George I. Helliet Coffee Company, Easton, Pennsylvania. Prior to joining Westinghouse she was laundry equipment specialist for General Foods. During the war, she was a Red Cross instructor assigned to working with nutrition and canteen groups. Her work with Westinghouse will entail demonstrations of home freezing, kitchen and laundry planning, and instructional meetings on the care and use of home appliances. She will also cooperate with home economics departments of universities, colleges, department stores, and utilities in carrying out this work. . . . *The National Association of Margarine Manufactures* has just published a new booklet, *Science Margarine Nutrition*, which deals with the scientific background of modern fortified margarine. It is available in quantities . . . . A new and improved line of stainless steel gas-fired cooking equipment is announced by *Standard Gas Equipment Corporation* under the name, "Vulcan Sterling." This line is now being manufactured in large volume on a production line basis . . . . *Wyandotte Chemicals Corporation* has published three new leaflets which will be sent on request. *Clean Hands* deals with the use of "Steri-Chlor," as a germicidal hand-rinse for workers in food processing plants and in other establishments where food is handled. *What, Why, Where, How* lists the advantages of Wyandotte Boiler Compound and gives directions for its use. A third brochure describes the company's line of products for maintenance cleaning—mopping and scrubbing floors, washing painted surfaces, and cleaning porcelain enamel . . . .John M. Welch has been appointed director of sales promotion for the *DuBois Company*, Cincinnati. Mr. Welch, an associate member of A. D. A., was director of sales promotion for the Commercial Cook Equipment Division of Hotpoint for 10 years. He has recently returned from Europe where he served with the Army . . . .To interpret and bring to the public essential information on foods and food research, *General Foods Corporation* has added Alice B. Kline, home economist, to its public relations staff. Miss Kline holds a master's degree in nutrition from Virginia Polytechnic Institute and has done research work on ascorbic acid metabolism at Cornell University, where she also taught foods and nutrition. Later she made several community diet studies while associated with the Connecticut Dairy and Food Council, Hartford. Two articles written by Miss Kline have appeared in recent issues of the JOURNAL. In the March, 1946, issue, she wrote on "Child Care Centers Contribute to America's Future," while a description of the nutrition consultation service of the Bridgeport, Connecticut, Community Advisory Service Center appeared in the May, 1946, issue.